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The Interpretation of Abdominal and Back Pain In Urological Diseases

CLYDE LEROY DEMING, M.D., F.A.C.S.
New Haven, Conn.

THE pain produced by urinary tract lesions is almost always specific, yet, it may be bizarre in its character and distribution. Many times it is very acute, severe and of short duration or it may be so insignificant as to hardly attract the patient's attention. Again, it may be chronic, periodic or continuous. An infected kidney or even a dead kidney often causes no pain whatsoever. As in obstetrics, the enormity of the labor pain does not always indicate a 10-pound boy, so in urology, the severe ureteral colic does not necessarily indicate the size of the stone.

Some doctors believe only in signs, others in symptoms, while our patients read newspaper advertisements for "Kidney Pills" and high colonics "to keep the kidney cylinders clear," and which affirm that "back-ache indicates Bright's disease." How carelessly do the laity speak of their stomachs as occupying a large geographic area in their front, while so specifically they point to their mid-lumbar and sacral regions for their kidneys. Surprised are those individuals when correctly informed of the exact locations of their vital organs, and yes, more surprised are we physicians when, after a lengthy history, the physical examination points to quite a different organ involved. One must

not be careless in the absolute location of pain, if accurate deductions are to be made. The lack of history and the exact location of the pain are the two most frequent reasons why our friends suffering with right renal and ureteral stones or kidney infections have had their appendices removed.

Undoubtedly pains in the upper right quadrant give us the greatest difficulty in diagnosis. Rarely, if ever, do kidney lesions give pain referred to the costal cage or above. Kidney pains are usually located in front on the skin surface at the anterior axillary line below the ribs, not on the ribs, nor posteriorly, but directly in the costovertebral angle. Anteriorly, the point must be differentiated from the gall-bladder, which lies under the rectus muscle, and from the appendix, which lies lower and farther down; and posteriorly from the erector spinae group of muscles, often involved in so-called "lumbago" and bony lesions of the vertebrae. Kidney pain, often sudden in onset, begins anteriorly and, as the tension within the kidney increases, radiates to the costovertebral angle. Inflammation of the kidney pelvis or the obstruction of the outlet of the pelvis by stone or by stricture first gives pain in front; but, as the tension becomes greater and the capsule of the kidney becomes distended, the pain becomes greatest in the costoverte-

From the Department of Surgery, Yale University, and the New Haven Hospital, New Haven, Conn.
Read before the 105th regular meeting of the Associated Physicians of Long Island, June 20, 1933, at Long Beach, N. Y.

bral angle. A pyelitis pain contrasted with the appendicitis pain is usually preceded by a chill, while an appendix pain is almost never preceded by a chill. In the child the appendix, as you know, may lie high, even behind the liver, making the surface reflexion points difficult to differentiate. The gall-bladder disturbance is usually definitely localized over the gall-bladder and radiates directly through the abdomen to the back or shoulder, a condition rarely, if ever, seen in renal lesions. Intercurrent pulmonary infections and diaphragmatic pleurisies are associated with exaggerated pain on deep inspiration. A kidney badly infected may give this picture only when its upper pole comes in contact with the diaphragm, and even then it is usually so enlarged that it can be easily palpated at its lower pole unless the patient is obese. An abscess beneath the capsule of the kidney or perirenal abscess gives constant pain in the costovertebral angle. The subdiaphragmatic or subhepatic abscess rarely points here, although pelvic abscess from below may follow up the psoas muscle and make itself known here. Pain caused by a renal tumor is usually produced by stretching of the kidney capsule and is found in the costovertebral angle.

The so-called Dietl's crisis with which you are all familiar is ureteral colic. It is a sudden onset of pain which is severe, sharp and fairly well localized in the line of the ureter and is often accompanied by a feeling of nausea or vomiting. It may be the result of passing a stone or a blood clot or of a sudden kinking of the ureter. Nephroptotic patients often give such a history. Besides their local pains, they complain of a long train of nervous symptoms if the condition is of long standing. We may expect to find this condition in long, thin individuals or after loss of much weight or in women who have borne several children. These symptoms do occur in men. Occasionally, we see jaundice in these individuals and it is a well known fact that nephroptosis may be accompanied by cholecystitis or kinking of the cystic duct. General visceroptosis must also be kept in mind with the nephroptotic pains.

The mid-line pains above the umbilicus are more frequently due to urological lesions than was formerly thought. Occasionally, we see a right or left kidney infection complicated by a stone giving gastric distress, nausea and vomiting.

Cecil of Los Angeles reports that 30% of his cases of hydronephrosis had been operated upon for gastric lesions. Colby of Boston reports the cure of several vomiting cases by a right nephrectomy. This phenomenon is explained by the connections of the sympathetic nervous fibers which pass through the superior and inferior mesenteric ganglia from the renal pelvis, ureter, cecum, stomach and duodenum. I have personally had four cases of uremia due to prostatic obstruction operated upon for gastric lesions.

The upper left quadrant is subject to the same pains from the kidney as are seen on the right. Here, cardiac pains, splenic and pancreatic complications are to be considered. Again, renal lesions causing pain are rarely present with negative urine. The constant dull or more severe pains seen in Bright's disease are distinguishable by a careful urinary examination. Renal infarcts usually are accompanied by some red blood cells while splenic diseases are not. The splenic infarcts give pain on the lower chest wall and are often accompanied by a friction rub due to the perisplenitis. You may be surprised to learn that a urologist sometimes uses a stethoscope. More specialists should use it often. You who are general practitioners have the advantage of seeing many of these cases early and are in a

position to make accurate diagnoses before the picture becomes masked by complications.

As we move towards the center of the abdomen we rarely encounter pain about the umbilicus due to urological lesions. *Tabes*, manifested by various cramp-like pains near the umbilicus, is or used to be fairly common. One must not forget the inflammations of the navel in some cases which will, of course, be accompanied by some redness and swelling. However, we must admit that tumors other than herniae are rare.

The mid-ureteral obstructions due to stone, kink or strictures produce a localized area of pain sharp or dull, and as the obstruction increases the pain is referred to the kidney, or, if there is partial obstruction with increased ureteral irritation, the pain is referred to the bladder, urethra or to the external genitalia. A stone in the left ureter may give rectal pain. As a rule, the mid and lower ureteral lesions cause a radiation of pain toward the outflow of the urine.

Perhaps *tabes mesenterica* or tuberculosis of the mesenteric lymph glands gives as puzzling a picture as any that we see. During the past year, we have seen one or two such cases each month. The pain is usually chronic, located anywhere in the mid-abdomen. It often radiates across the abdomen horizontally, up to the pit of the stomach or even down toward the bladder region. Some of the cases even have frequency of urination when the glands lie close to the lower ureter.

Frequently, the differential diagnosis of an acute appendicitis or a ureteral stone lodged in the appendiceal area arises. Both may be associated with gastric symptoms of nausea and vomiting and both may be cramp-like in nature. The urine is usually negative when the lesion is appendiceal, but sometimes if an acutely inflamed appendix lies on a ureter there are seen pus cells in the urine; but rarely does one find organisms in the urinary specimen unless the appendiceal abscess has ruptured into the ureter. Ureteral stones are usually manifested by red blood cells in the urine; although they may not be discernible to the naked eye. Such an attack is not accompanied by elevation of temperature. Palpation of the area will reveal deep tenderness when the lesion is ureteral while the appendix will give more superficial peritoneal irritation. Rebound examination is of great importance and will elicit much pain if the appendix is involved.

One of the most frequent causes of a feeling of fullness and cramp-like pains in the lower mid-abdomen is the full bladder. The patient may be passing urine at fairly regular intervals and say nothing about the quantity. Others, of course, have the so-called paradoxical incontinence of micturition. This history, with palpation of a dome-shaped tumor mass above the pubis, should not make the diagnosis a difficult one.

Not infrequently a well-nourished individual of between twenty and fifty-five years enters your office complaining of definite pain in the right or left lower quadrant. Pain is acute and sharp during and following urination. There is a feeling of pressure in the bladder, perineum and rectum. Such individuals get up frequently at night, void a small quantity of urine every hour or so during the day, feel tired, lack energy for doing their day's work and become nervous and constantly fatigued. The urine is most always clear, and negative on chemical and microscopic examination. These cases are the most sharply defined group of cases that we see and are suffering from so-called interstitial ulcers of the bladder.

(Concluded on page 324)

The Nature of Medicinal Springs

1. The Peculiar State of Iron in Saratoga Water

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New Haven, Conn.

THE curative action of the waters from natural medicinal springs is indisputably attested by the experience of thousands of years and requires no further proof. To what this favorable action, which has been observed in thousands of cases by physicians and patients alike, is to be attributed, is a question which thus far has not been adequately answered. In this paper an attempt will be made to set forth that in the light of new viewpoints and of the results of recent research, the investigation of mineral waters can be directed along new lines, and that it is no longer a question of whether, but solely of when, the universities of the country will seriously occupy themselves with the study of balneology.

The term balneology used in medicine embraces the whole field of scientific investigation of mineral waters; we may call it the "science of the baths". It goes hand in hand with, and gives support to, the practical "science of bath economics", upon which is based the administration of curative resorts and watering places, together with the possible advantages for the national welfare to be derived therefrom.

Balneology, however, is not merely a department of medical science, but it is a special, complex field of knowledge which can only be covered by the cooperation of medicine with numerous other sciences, especially geology, meteorology, physics, and chemistry. Physiology, biochemistry, pharmacology and the clinic must all unite forces. Accordingly a physician has much to learn if he would be well qualified to administer treatment by means of baths, while nothing can be more damaging to the reputation of a health resort than physicians with insufficient knowledge of this special field of medicine. If the healing qualities of the American spas were more generally understood by physicians, the sick and those in need of rest and recuperation would visit the marvelous natural springs of the United States in far greater numbers than at present. For America is perhaps more blessed than any other land with health-giving treasures of soil and climate. But where are physicians to gain knowledge of these matters when up to the present time neither balneology nor balneotherapy is taught in any American university? Americans of means go to European watering places where they are carefully instructed how the water welling up from the ground can be used to promote their health. Above all else there are lacking here the traditions which have been established in Europe by specialists of world-wide reputation.

The use of various springs as curative agencies for the sick, and intelligent instruction in their employment, have always gone hand in hand in Europe. Whenever a sick or debilitated person goes to a spa to use its waters to regain health or to gain new vigor, his first move on arrival is to ascertain the name of a physician there who is familiar with the effects of the waters. Then, if the patient gets proper instructions, there is added to the physiological action of the water that comfort of mind which helps bring about recovery, or at least

improvement, since, as is well known, the will to get well is a very important factor in illness. Accordingly there is need at the spas of physicians with first class balneotherapeutic training, who can give intelligent advice concerning the external and internal use of the waters. Improper use, either in drinking or bathing, may, on the other hand, be very injurious. Every curative agency has, furthermore, a certain toxicity and one must therefore be familiar with its proper application. That there is in America, generally speaking, a dearth of physicians who can give adequate information is probably the chief reason why these valuable natural resources of the country, the mineral springs, are still unknown to most people. Dr. Simon Baruch, the eminent American pioneer in hydrotherapy who advocated the mineral water treatment and who studied especially the waters of Saratoga Springs from a clinical standpoint, was not given recognition in his time. A great deal of mineral water is now flowing away unused which might be rendered serviceable to the national health and wellbeing.

Americans who have taken a real "cure" at a European spa will be able to estimate correctly the value of the treatment and confirm the known fact that whoever has once experienced in his own person the beneficent influence of these natural medicinal springs is always anxious to return. A true course of treatment at these baths may be regarded as a rejuvenating process in the best sense of the word. Goethe is a classical example in point. With his genius for observing natural phenomena he recognized the blessing of medicinal springs, and visited Carlsbad and Marienbad again and again to preserve his health and to lengthen his life.

It is really astonishing how many physicians and scientists still reject "cures", whether through drinking mineral waters or through bathing therein, as a sort of superstition. Such persons simply have an aversion to recognizing "popular cures" and "popular wisdom" despite the acknowledged fact that such ancient discoveries have often pointed the way to successful modern research.

Chemical Properties of Iron Springs in General

Regarding the physiological significance of iron we know two things with certainty: its relation to respiration and its importance in building up haemoglobin, the red dyestuff of the blood. Diseases in which the blood contains too little iron are commonly called anaemias and for centuries iron in the most varied forms has been employed in their treatment. The ancient Greeks and Romans used iron compounds as tonics. They dissolved iron rust in wine or left an iron nail sticking in an apple for some time, in which way they obtained an easily assimilated compound.

The body of an adult contains about 3.3 grams of iron, of which 80% is present in the blood, while the remaining 20% forms a constituent of the organs. Accumulation of iron occurs chiefly in the liver, spleen, lymph glands, and in the bone marrow which is so important in the making of blood.

Obviously iron entering the body through the mouth can only become effective within the organism if it gets

into the circulation, i.e., is assimilated into the system. To this end, however, it must be present in a form which the cells of the stomach and intestinal walls can easily assimilate. Otherwise all the metal taken in through the mouth simply passes out with the excretions of the intestines and so fails of its purpose. It was observed in olden times, and is confirmed by very recent scientific study, that the iron of springs charged with carbonic acid is very quickly and almost wholly absorbed into the organism if the water is drunk right at the spring. It is possible in this way to increase the iron content of the body and to achieve results which mineral water that has stood for some time exposed to the air will no longer give. On drinking mineral water which has stood exposed for a time, all the iron is excreted and is therefore totally ineffective. The truth of this statement can be readily tested for excreted iron gives a dark color to the stool and is thus easily recognized.

These purely empirical observations on the absorption of iron by the blood were sufficient to show that only mineral water coming fresh from the ground or bottled in absolute absence of oxygen (air) is effective and that water which has changed in the air, or has aged, as it is termed, loses some special properties, and thus the general therapeutic effect of the iron suffers diminution.

As to the specific effects which absorbable iron can produce, experiments have demonstrated that it has an influence on the growth of the body and furthermore stands in direct relation to the breathing process. But one still has no scientific basis for the empirically observed fact that iron also influences metabolism and assists the combustion of food in the body.

In nature generally, there is a marked tendency to transform labile forms or systems into stable ones. To the chief labile systems belong the colloids. Mineralogists and geologists, who are able to base their conclusions on particularly long periods of time, i.e., on very protracted experiments in the universe, teach us, on the one hand, that the cases in which colloidal systems or unstable crystalline forms once played a rôle are very numerous in nature, and on the other hand, that systems rarely continue in the original labile form or unstable state. Thus, from the crystal-clear hot mineral water at Carlsbad the originally contained calcium bicarbonate is precipitated in the relatively unstable form called aragonite (calcium carbonate), which in course of time changes into calcite (calcium carbonate), the stable form. This transformation is demonstrated visibly in the geologic strata at Carlsbad. The essentially new idea respecting the therapeutic significance of mineral waters and their constituents rests upon our observations, and these must be explained further if they are to be understood.

We may assume the colloid state to be the most labile system among inorganic substances. The colloid system, e.g., colloidal sulfur of sulfur springs or colloidal iron of iron springs, can never be stable. Two types of forces are always at work: the one seeks to enlarge the particles of the colloid, while the other arranges the particles to form crystals. This process goes on of its own accord, though sometimes very slowly, and is accompanied by the development of free energy.

At the outset labile crystal forms develop which then pass gradually—sometimes through intermediate forms—into the ultimate stable form, just as the aragonite of Carlsbad is transformed in the course of geologic ages into calcite. External influences such as

warmth, light, pressure, etc., can often greatly accelerate the process.

For us the decisive question was: Can an unstable form of an inorganic compound (e.g. colloidal sulfur, aragonite, or active iron oxide) have a physiological action different from that of the corresponding stable form (crystalline sulfur, calcite, or inactive iron oxide)?¹ In other words, can one and the same chemical compound show different physiological or biological effects simply on the basis of a difference in physical structure? Naturally we cannot discuss at any length here the question of what physical forces may come under consideration of the basis of different states of the solid forms, but it will occur to anyone acquainted with natural science that the surface area of different crystalline forms will vary with size and type, and further that the energy released during the change from the labile to the stable state may sometimes find employment on the spot.

The forces which prevail on the surfaces of solid bodies may appear to the uninitiated infinitesimally small and scarcely worth taking into account. To such objections we must reply that modern knowledge with the aid of such surface forces of certain substances called catalyzers is bringing about marvellous chemical processes which may change our whole economic life. The surface forces of solids are, however, intimately related to the size of the solid particles, still more to their specific crystalline form, and most of all to certain labile atomic states of individual portions of the surface and to its magnetic properties. So it was logical to draw the conclusion that the form of a compound might bear some relation to its possible biological action, since this latter also represents a chemical reaction.

Fresh mineral water containing iron also shows certain catalytic reactions toward hydrogen peroxide, breaking it up into water and oxygen; this power is gradually lost upon exposure to air and light. These reactions, which cannot be accurately described here, but which may be brilliantly demonstrated with color reactions², are also characteristic of the blood. Those interested will find a detailed account of the catalytic properties of Saratoga waters in an article by Oskar Baudisch and David Davidson entitled "Mineral Waters in the Light of Modern Research" in the *Archives of Internal Medicine*, 40, 496 (1927). Professor Bickel assumes, and has supported the assumption with experimental data, that the therapeutic value of the iron in fresh mineral water may be related to its special catalytic property. It is, therefore, very interesting to note that the Saratoga mineral waters, which contain iron, are bottled in such a perfect manner as to exclude all air and thus keep the catalytic action unimpaired. It would be interesting indeed to determine whether Saratoga water which has been long bottled also keeps its physiological and related therapeutic values virtually unchanged. We investigated some Saratoga water which had been kept some six years in plain glass bottles; it was still perfectly clear, showed no deposit on the glass; from a purely chemical standpoint we found its catalytic properties still absolutely unimpaired. Biological experiments are, however, a much more delicate indication of inorganic aging phenomena, and it is impossible to say *a priori* whether water which has stood thus

¹ O. Baudisch: *Active Iron. Science*. Vol. 77, pages 317-319 (1933).

² O. Baudisch and H. v. Euler (New York and Stockholm). *Biochemische Zeitschr.* 212, p. 149. (1929).

in bottles would show in Bickel's experiments the same action as water fresh from the springs.

Natural and Artificial Saratoga Water

If it can be shown that a mineral water contains beside ferrous bicarbonate ions also iron in the form of relatively stable complexes, then, undoubtedly not only its physical and chemical properties but also its biological action will be fundamentally different from that of ordinary ferrous ions. Aside from the specific action of a complex bound iron atom, we must consider also the possible effect of the masking of the autoxidizable divalent iron when the material is administered by mouth. The decomposition of the complex within the organism, the formation of ordinary ferrous ions in the nascent state, and their oxidation to ferric ions internally might reasonably lead to the occurrence of the assimilation process at different points than is the case with ordinary ferrous bicarbonate ions.

A more thorough investigation of the state of iron in iron-containing mineral waters appears sufficiently important to us to extend the researches on the Saratoga mineral waters previously begun in conjunction with Davidson. It is to be seen from our former work that as concerns the catalytic decomposition of hydrogen peroxide, the properties of the Saratoga waters are more striking than all previously investigated waters. This fact is related not only to the amount of dissolved iron but also, most directly, to the form of the dissolved ferrous ions or complex ions. In the following table, it will be shown that there are, in fact, mineral waters which contain iron also in a *masked* form.

Reagent	Natural Coesa Water from freshly opened bottles pH 6.4	Artificial Coesa water through which CO ₂ was passed pH 6.4
0.3% Benzidine-HCl + dilute H ₂ O ₂	Blue	Blue
Guaiac - Phenol - H ₂ O ₂ mixture	Blue	Blue
Reduced Phenolphthalein + H ₂ O ₂	Red	Colorless
1% Pyrocatechol-ortho - carboxylic acid in bicarbonate-containing water.	Colorless (Pink after ten minutes)	Red

On the basis of very exact analyses we first prepared artificial Saratoga water (Coesa and Geyser), adding the iron in the form of metallic iron powder from iron carbonyl to the completely anaerobic system through which pure oxygen-free carbon dioxide was passed until all the iron had gone into solution as ferrous bicarbonate. We could now compare "artificial" Saratoga water with the natural. Special care was taken to bring the investigated waters, artificial and natural, to the same hydrogen ion concentration before making our experiments. A repetition of our quantitative experiments on the catalytic decomposition of hydrogen peroxide³ at once showed striking differences. The catalytic action of iron in the artificial water was much less than in the natural.

As this fact was obviously not sufficiently indicative

of the existence in natural waters of a special state of iron, we next strove to find new reactions which would show that the iron in natural waters is masked and that it is not the associated substances alone which condition this masked state. In the accompanying table is given a comparison of the experimental results with both waters, from which is seen the lack of specificity of the benzidine and guaiac reactions on which other investigators have principally based the "activity of iron springs."

From the experiments in this table it is further readily seen that depending on the nature of the reagent used natural and artificial Coesa mineral waters may behave the same or differently. The benzidine as well as the guaiac reactions are given to the same extent by both waters. Reduced phenolphthalein-hydrogen peroxide, on the other hand, is only colored red by the natural water, while the artificial water has not the slightest effect upon it. The experiment with pyrocatechol-ortho-carboxylic acid clearly shows the masking of the ferrous ion in the natural water. While artificial water immediately becomes deep red with this colorless reagent, the natural water remains at first entirely unchanged and only on long standing does the deep red ferric salt of the sodium pyrocatechol-ortho-carboxylate gradually form.

As previously mentioned, our former researches have shown that great differences exist between ferrous bicarbonate solutions and the natural mineral waters of the Saratoga district with regard to their photochemical behavior. We therefore investigated the influence of the carbon arc light on natural and artificial Coesa waters. In these experiments it was again possible to demonstrate the greater stability toward oxidative influences of the divalent iron in the natural water, in this case, toward the oxygen of the air under the influence of light energy. The following color reaction occurs sufficiently quickly and clearly to make a very suitable lecture demonstration for this purpose.

A long-necked quartz separatory funnel was filled with natural Coesa water and the contents shaken for a few seconds. Hereupon 0.5 g. of sodium azide (NaN₃) and 0.5 g. of finely powdered potassium ferrocyanide (K₄Fe(CN)₆) were introduced, the vessel shaken once and then exposed to the carbon arc light while being cooled. The previously light yellow colored solution became deep violet and clear and then gradually a turbidity occurred with the formation of Prussian blue. With artificial Coesa water the same experiment gave an entirely different result. On introducing the ferrocyanide there was an immediate turbidity (potassium ferrous ferrocyanide) which, under illumination, was transformed in a few seconds into a precipitate of Prussian blue.

The violet color in the natural Coesa water indicates the formation of the deep violet colored potassium pentacyano-aquo-ferrate. This experiment shows that in natural mineral water ordinary iron ions are not available to react with the ferrocyanide introduced to form Prussian blue. In the artificial Coesa water the simple ferrous ions react instantaneously with ferrocyanide introduced and form Prussian blue by reacting with the oxygen dissolved in the water (particularly under the influence of the carbon arc light).

The previously described color reactions clearly show that the accompanying substances in the artificial Saratoga water are not alone sufficient to protect the ferrous bicarbonate ions against oxidation and to hinder their mentioned characteristic reactions. *There is a distinct*

³ O. Baudisch and David Davidson, loc. cit.

difference between the oxidizability of the divalent iron in the natural and artificial Coesa waters. Our previously published assumption⁴ that the iron in the Saratoga springs is bound in a relatively stable complex has thus been confirmed. It was, therefore, an important question to see if further, perhaps quantitative indications therefor, could be found.

It is known that the electrical conductivity of complex ions in most cases is less than that of the corresponding simple ions. The electrical conductivity of a solution is determined by the number of free ions per unit volume and their mobility. The latter is dependent on the reciprocal electrostatic influence (Debye effect) and on the viscosity of the medium. We have previously found that the iron dissolved in Saratoga waters can be quantitatively precipitated as ferrous iron by means of light energy in the absence of oxygen. If the iron in natural mineral waters contributes to the conductivity then there must be a considerable difference in the electrical conductivity before and after irradiation (after the quantitative precipitation of the iron). Obviously, exceedingly sensitive apparatus is required for these measurements. We are indebted to Dr. Shedlowsky, of the Rockefeller Institute, who carried out the measurements with his exceedingly delicate apparatus. Concerning this apparatus the following data are appended:

The temperature was controlled within 0.002°C. The conductivity was measured with a newly constructed and especially shielded bridge, a vacuum tube oscillator with a sinoidal wave of a frequency of 1000 serving as a source of current. As a detector a two-stage amplifier was used which allowed a simple determination of the resistance with an accuracy of more than 0.01%. The solution to be measured was placed in a pipette-like conductivity cell of Jena glass. Well platinized platinum electrodes were directly fused into the cell. The cell constant was determined by means of a carefully purified potassium chloride solution of known conductivity. (Parker and Parker, *Jour. of the Am. Chem. Soc.*, vol. 46, p. 332, 1924). The temperature of the measurements was 25°C. For the conductivity measurements, Coesa and Geyser waters were used. In making a determination, the procedure was as follows:

The contents of several bottles of Coesa water were poured with careful exclusion of air into a quartz separatory funnel, the stopcock as well as the surface of the water in the long neck being sealed with vaseline. After the excess carbon dioxide had escaped through the liquid vaseline, a portion of water was removed without the access of air, and its conductivity measured. The separatory funnel was then cooled with running water ($t=13^\circ$) and irradiated with the carbon arc light for 24 hours. The previously clear contents became turbid with time and the iron gradually separated as a flocculent light yellow precipitate. The clear liquid remaining above was again measured.

$$\begin{array}{r} \text{Reading Corrected Specific Conductance} \\ R \qquad \qquad \qquad 15.057 \\ L = \frac{\qquad \qquad \qquad}{R} \end{array}$$

Coesa water, filled
Dec. 1926

⁴O. Baudisch and David Davidson, loc. cit.

Before Irradiation	1000.5	999.3	0.01507
After Irradiation	999.6	998.3	0.01508
Geyser water, filled Dec. 1921			$L = \frac{15.051}{1705.7}$
Before Irradiation	1709.0	1707	0.008810
After Irradiation	1707.9	15.051	
	1707.7	$\frac{1706.4}{1706.4}$	$= 0.008824$

From the experimental results it is to be seen that the conductivity of the mineral waters after the separation of the dissolved divalent iron contained therein is practically unchanged. We must conclude, therefore, that the iron dissolved in mineral waters contributes no real part to the electrical conductivity; that is, the number of free ferrous ions in the mineral waters investigated by us can only be exceedingly small. The principal part of the iron is present in the masked form—a conclusion clearly indicated by the previously described color reaction. At present, we can say very little of the chemical composition of the iron complex.⁵ We are also aware that a quantitative mathematical evaluation of the conductivity measurements will only be possible after carrying out many parallel experiments with artificial and natural mineral waters.

Our findings are a beginning of further study of the state of the heavy metals in natural mineral waters. Only when we have succeeded in learning the make-up of such complexes—in which work magnetic and X-ray measurements will be important tools—will one be able to think of artificially producing natural mineral waters. We are still quite far from this goal.

In conclusion, I may urgently suggest that in future work with "active" and "inactive" iron in mineral waters, one will at least have to distinguish between ferrous or ferric ions, ferrous or ferric complex ions, and reactions on solid surfaces of iron oxides or salts. In the case of ferrous bicarbonate it appears that the reactions of the ferrous ions are not parallel to the reactions occurring on the surface of a freshly precipitated ferrous bicarbonate⁶ and equally well does the work with spatially isomeric iron oxides⁷ indicate that we are still far distant from an understanding of the biological action of iron.

Perhaps what has been outlined here briefly will suffice to give the physician who is unfamiliar with mineral water treatment some inducement to ponder the question whether, after all, nature has not given into our hands in the wise use of mineral springs a curative agent for which we should be grateful.

Just as people discovered those springs which are strongly radioactive long before the discovery of radium itself and used these waters for the cure of definite diseases, so today in the Old World it is not in vain that mineral springs are recognized as cures for specific ills. All attempts to imitate natural medicinal waters or their salts artificially have fallen far short of success,

⁵The iron complex is probably a cytochrome, a hemochromogen compound which we find in the plant as well as in the animal kingdom. (O. Warburg: *Naturwissenschaften*, 1929) and O. Baudisch and H. v. Euler: *Biochemische Zeitschr.* 212, p. 155 (1929).

⁶⁷O. Baudisch and Lars A. Welo: *Chemische und physikalische Studien zum Mineral- insbesondere zum Eisenstoffwechsel*. *Naturwissenschaften* 16, No. 36 (1925) O. Baudisch: *Über die Wirkung verschiedener Zustandsformen des Eisens auf sein chemisches Verhalten*. *Naturwissenschaften* 16, No. 27, p. 542, (1928).

(Concluded on page 304)

The Treatment of Ulcerative Colitis

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FOR the past decade there has been a great deal of controversy in regard to so-called non-specific ulcerative colitis. Its bacterial etiology has been discussed with particular acumen, on one side by the followers of Bergen and Rosenow, who claim to have established a diplostreptococcus as the specific cause of the disease, on the other side by Paulson and many other bacteriologists and clinicians, who contend that the organism described by Bergen is not only not the specific cause of the disease, but that Bergen's work has been done with various strains of bacteria and not a specific organism.

For a long time it has been believed that the disease could be caused by bacteria, ordinarily innocuous, which have for some reason become pathogenic to the individual, even the colon bacillus having been suggested as the etiologic factor. Dietary vitamin deficiencies have been advanced as a cause of the disease, endocrine disturbances have been pointed out as a contributing factor, and the relation of focal infection, a part of Bergen's hypothesis, has been shown to be quite definite at times. Allergy as the cause of the disease has not received the attention it deserves. Specific food sensitiveness has been shown to be a definite contributing cause if not the sole etiologic factor in fully one-half of our cases of this disease, and it is possible that bacterial allergy or even sensitization to some of the products of bacterial activity at the site of an infective focus might place ulcerative colitis entirely into the rapidly growing group of allergic manifestations.

The *pathology* of this disease is very interesting. Whereas in the early stage there may be only hyperemia and edema of the mucosa, often with multiple punctate raised spots, this stage is rapidly succeeded by a general necrosis, involving not only the mucosa, but usually also the submucosa and even the muscular coat. In rare severe instances the process may involve the serosa also, producing single or multiple perforations. The bowel lining gives the appearance of large areas of sloughing, with a raw, bleeding, irregular surface covered with exudate and occasionally with a diphtheritic membrane. There are few, if any, discrete ulcers, although there may be seen at the same time various stages of the process. The diffuse ulceration, with sloughing and exudate, resembles more than anything else a severe eczema or an exfoliative dermatitis, and suggests, as in the case of these skin conditions, a general cause such as allergy rather than a bacterial infection, although, as in the skin, bacterial invasion later takes place and may be an important factor in prolonging the healing. The lesions, while often more marked in the rectum, sigmoid and cecum, are usually present to a greater or less degree throughout the colon, but rarely involve the terminal ileum. Long continued or repeated attacks of this condition may produce granulomatous changes or may result in the formation of single or multiple polypi, which may later undergo malignant degeneration. As a rule there results a thickening of the entire bowel wall, due to fibrosis, and there may occur subsequently cicatricial contractions or pericolic

adhesions producing localized narrowing with shortening and disfigurement of the entire colon.

The *symptoms* of ulcerative colitis may be mild or severe, often independently of the severity of the lesion. The onset may be gradual, but more often is quite abrupt, with more or less severe abdominal and rectal pain and tenesmus, and the passage of bright red blood mixed with mucus and usually with pus. In most cases diarrhea is a prominent symptom, with from ten to twenty-five rectal discharges per day, but these discharges may contain little if any fecal material, being merely the discharge from the sloughing, bleeding bowel lining. There have been cases with only one or two such discharges per day. As a rule fever of a low septic type is present, leucocytosis varies (in our group the average was 9600 white blood cells), and allergic manifestations elsewhere may present themselves. As weeks and months pass by, progressive emaciation, anemia and dehydration so reduce the patient's vitality that an exacerbation of symptoms or an intercurrent infection may result fatally. If recovery takes place repeated attacks may occur.

The *diagnosis* of this condition depends upon several factors. The history of symptoms as above described, especially if previous attacks have occurred, is very significant, although in the absence of previous attacks the presence of a neoplasm must be considered. Tuberculosis and syphilis may produce similar symptoms and very similar lesions, and must be ruled out. We do not consider it proper to include in the term "ulcerative colitis" cases of colitis not showing the typical bleeding, sloughing condition described above.

Proctosigmoidoscopy will show the typical lesions, if this region is involved, which is usually the case. They should not be easily confused with the lesions of amebic dysentery, but scrapings and smears should be examined for amebae and cysts. The finding of polypoid or granulomatous changes suggests, but does not definitely indicate, similar changes higher up in the bowel, and is a warning that malignant changes in one or more of these polyps may already have taken place.

Bacteriologic study is best carried out by means of cultures made directly from the region of the sigmoid through the sigmoidoscope, the patient not having received any cathartics or enemas in preparation for this examination. The cultures may be used to rule out the specific dysenteries, by the finding of the Flexner or Shiga organisms, and may be used to prepare autogenous vaccines or bacteriophages. Although our bacteriologists have frequently found organisms resembling Bergen's diplococcus, they have not often been able to differentiate it definitely from other organisms of the enterococcus group. In our series of 30 cases forming the basis of this study, enterococci were found in 14, or 47%, *B. coli* in every case, streptococcus and staphylococcus each in one case and anaerobes of the bacteroides group in several.

Gastric analysis is of no importance in these cases. In our 30 cases, fractional gastric analyses after intramuscular injection of histamine revealed normal findings in 65%, low findings in 20% and high reactions in 15%. There were only two patients showing an achylia.

From the Gastroenterological Service, Long Island College Hospital, Brooklyn, N. Y. Read before the annual meeting of the American Gastroenterological Association at Washington, D. C., May 8th, 1933.

Roentgen-ray study is of great importance in the diagnosis. In the gastrointestinal series following a barium meal, hypermotility may be the only prominent factor; the bowel being filled or even partly emptied in the six-hour film and often completely empty in less than twenty-four hours. A fuzzy or irregular outline of the bowel may be shown in the six-hour film, or in subsequent films where hypermotility is not a prominent finding. *The opaque enema* gives the most valuable clues to the condition. The thickened bowel wall is indicated by a smoothing and narrowing of the lumen, with diminished or entirely absent haustrations. The sloughing, irregular lining is shown by a fuzzy outline or by areas of irregular defect. The late changes, localized cicatricial contractions or a general diminution in the size of the bowel, are demonstrated a garden hose. Polypoid changes are best demonstrated by the double contrast enema, air being introduced into a bowel thinly coated with barium, the polyps being thrown into bold relief by this method.

An allergic study should consist not only of cutaneous sensitization tests, which are probably of the least value in this type of manifestation, but should include careful dietetic studies, either by means of elimination diets or by "addition diets" (starting with starvation or with the old Bulkley rice and water diet and adding foods daily until symptoms are noted). In a condition such as this, with symptoms occurring continuously, the allergic factor is one which is undoubtedly acting constantly, so that if a food, it would be one usually taken daily by the patient. Foods such as milk, eggs, wheat and potato are therefore most probably among the allergic factors, it being recognized, however, that other occasionally ingested foods may add to or prolong the condition, and that extraneous factors such as inhaled emanations or focal infections frequently also play a part. In 14 cases showing evidences of allergy as a causative factor milk was found to be the principal exciting cause in 8, wheat in 5, potato in 3, whereas none of these cases showed sensitization to egg.

The treatment of ulcerative colitis must take into consideration all the etiologic and contributing factors in this disease. At the outset it must be recognized that in this disease, perhaps to a greater degree than in any other gastrointestinal disturbance, the long continued, exhausting and enervating character of the symptoms has had a very serious effect upon the patient's physical and psychological condition. *Rest*, both physical and mental, is therefore the first indication. The patient should be in bed, in pleasant surroundings, and all possible causes of nervous irritation should be avoided. An atmosphere of cheerful optimism as to the outcome of the treatment should be carefully fostered. Nerve sedatives are occasionally desirable in instituting treatment, but should not be continued long on account of their depressing effect.

General hygienic care should include the use of sunshine or ultraviolet radiation in increasing doses. The intravenous or subcutaneous administration of saline and dextrose solutions is usually indicated, and transfusion has been shown to have not only an excellent general effect in increasing blood volume and stimulating hematopoiesis, but may have a direct effect by adding antibodies to the circulating blood. Iron and calcium are helpful adjuvants.

Dietetic treatment involves several factors. As the patients are usually in a poor state of nutrition, high caloric diets are indicated, and a high vitamin content is considered essential. However, it is absolutely necessary to avoid foods to which the patient has been

shown to be sensitive, and success in treatment may depend entirely upon this factor. This may preclude the use of such foods as milk, eggs or wheat, and suitable substitutes must be provided. Desensitization, specific or non-specific, had best be left until convalescence has been established. Although a smooth diet is ordinarily considered to be desirable, the very necessary high vitamin content, usually obtained by means of a diet containing considerable roughage, has not often been found to be an irritating factor in this disease. We have found that most patients tolerate fruits and green vegetables very well, provided they are not foods to which the patient is sensitized, although where it can be demonstrated that they produce mechanical irritation, vitamins may have to be supplied in the form of concentrates, added to a smooth diet.

Endocrine therapy has at times been of help, the most successful form in our experience being administration of parathyroid extract and calcium. Blood studies have shown at times, but not consistently in all cases, a marked diminution in blood calcium in this disease, yet bringing the calcium up to normal does not necessarily cure the condition, although temporary relief may be quite marked. Epinephrin and pituitary extract have also been found to be of value. In passing, it may be well to call attention to the fact that these types of endocrine therapy are also of much value in allergic conditions in general.

Removal of focal infections is of the utmost importance. We have seen patients whose symptoms persisted or showed a marked tendency to recur until all foci had been removed. Thorough eradication of foci should include not only the extraction of all devitalized and badly pyorrheic teeth, the cleaning up of residual alveolar infections and the removal of infected tonsils, but should consist of a systematic search for and removal or treatment of nasal sinus infections, pelvic or genitourinary infections or any other chronic foci. The removal of foci should be started as soon as the patient's condition will permit, even though at times it may produce some exacerbation of symptoms.

Immunologic therapy includes the use of vaccines, serums, bacteriophages, stool filtrates and attempts at desensitization, specific or non-specific.

Vaccines (autogenous), made from cultures of stools or of sigmoid content obtained by proctoscopy, were in use before the presentation of the Bargaen organism gave an added impetus to this form of therapy. In our experience with autogenous vaccines (Bargaen's or other organisms) we noted that little, if any, direct effect on the lesions followed their use, except where a febrile reaction was induced, and this effect was no different from that produced by stock vaccine or non-specific protein therapy. We have abandoned the use of vaccines. The use of a serum of the Bargaen organism, in the absence of adequate proof that the organism produces toxins causing the characteristic lesions or even other symptoms, seems hardly desirable, even where the Bargaen organism has been obtained from the stools, and its present promiscuous use in all forms of chronic diarrhea is not to be recommended. At best, the serum probably acts merely as a foreign protein.

Bacteriophage, as first suggested by d'Herelle, has been found of use mainly in cases of ulcerative colitis in which the *Bacillus pyocyaneus* has appeared to be the causative factor, but it has been difficult to develop a satisfactory phage for the enterococcus group of organisms so frequently found in this disease, and experience with a stock mixture of intestinal bacteriophages has not been of sufficient value to warrant its continued use.

Berkefeld filtrates of specimens of stools, mixed with water and allowed to stand for from twelve to twenty-four hours at room temperature, have been given in increasing doses hypodermically with some very brilliant results, but eight years ago the occurrence of a perforation of the bowel wall soon after the injection of a dose of such a filtrate caused us to abandon the use of this form of therapy.

Desensitization to specific proteins shown to be an etiologic factor is difficult and not to be recommended during the acute stage of the disease, although in a recent case in our series, the administration of a specific peptone of milk (milk propeptan), one-half hour before feedings, made it possible to give the patient this valuable food even though he was definitely sensitized to it. Non-specific desensitization by means of the intravenous injection of foreign protein has been shown to be of considerable value, but in our experience the degree of improvement was dependent to a great degree on the severity of the febrile reaction produced. We found that typhoid vaccine was the simplest and best agent to use for this purpose, milk protein being avoided because of the fear of excessive reactions in persons showing sensitization to milk. Theoretically, of course, the effects of foreign protein reactions would be equal whether the disease was an expression of an allergic reaction to food or bacterial protein or to an actual infection. In connection with this discussion of the effect of febrile reactions, it may be well to mention that in a patient with the typical lesions of ulcerative colitis, but with a history of only two weeks' duration, the production of daily febrile reactions, with temperatures up to 102° F. by means of hot baths, resulted in complete clearing up of the condition within a period of twelve days.

The methods of treatment thus far discussed have all been general in character, the only possible specific treatment being the last named, and that of a very doubtfully specific nature. Direct attack upon the diseased area has been attempted in various ways, none of which have proved satisfactory. *Oral administration* of intestinal antiseptics, acidophilus cultures, castor oil, and salines has been tried with no beneficial results, except that small frequently repeated doses of castor oil have at times caused considerable alleviation of symptoms, the effect being probably explainable on the basis of its detoxifying effect. Large doses of bismuth salts, barium sulphate, kaolin and other bowel sedatives and demulcents have been found to be of no lasting value. *Transduodenal lavage* with various antiseptic solutions, often preceded by a thorough colonic flushing with a hypertonic solution after the method of Jutte, has also been tried, with some temporary benefit.

Treatment per rectum has of course received the greatest attention in this disease. Irrigations or instillations of astringents, demulcents, hemostatics and antiseptics have been tried and have been found to produce no lasting results, at times even adding to the irritation and causing aggravation of symptoms. In excessive bleeding a retention enema of a hot 10% gelatin solution has occasionally been of value. Insufflation of powders, antiseptic, astringent or demulcent, while satisfactory in treating lesions within reach of the proctoscope, is not applicable to the treatment of a generalized colonic condition. The distention of the bowel with oxygen, in increasing doses, as suggested by Felsen, has been shown to reduce or eliminate spore-bearing anaerobes and to have some stimulating effect on the bowel mucosa, but reports of its use do not indicate any particular reduction in the period of treatment as

compared with cases treated by general hygienic measures alone. This may also be said of the ionization method suggested by Burnford.

Surgical treatment has been instituted where various forms of medical treatment have appeared to be unsatisfactory. Operations are necessary in cases with intestinal obstruction due to cicatricial contractions or pericolic adhesions, or where perforation has occurred. In cases without these complications, surgical intervention is instituted for three purposes, viz., first for the purpose of drainage, by means of ileostomy or cecostomy, to put at rest the diseased area and prevent its direct irritation by fecal material; secondly, for the purpose of permitting irrigation or direct application of medication to the bowel from above, which is also accomplished by the operations just mentioned, or by a simple appendicostomy, the latter having been recommended because the stoma can so easily be closed; thirdly, for the purpose of entirely removing the diseased bowel, by a colectomy, an extremely dangerous procedure when the badly infected condition of the bowel is considered. In our experience no lasting benefit has resulted from surgical treatment, and we do not recommend it except where complications render it necessary, as stated above.

Radiation treatment, by means of the Roentgen ray, requires too extensive an area of exposure to be entirely safe in the treatment of the active stage of this disease, but stimulating treatments over the splenic area have appeared to be of some value where excessive hemorrhages have occurred. Where granulomatous changes have developed or where slow or threatened perforations have produced a pericolicitis with much inflammatory exudate, radiation may be of considerable advantage.

Mercurochrome, intravenously administered, has in our experience proved to be the most satisfactory treatment for the prompt alleviation of the severe symptoms of this disease. It was first used for this purpose by D'Albora in February, 1925, his attention having been called to the fact that mercurochrome was excreted into the intestinal tract when, in a case of erysipelas with streptococcus septicemia, an intravenous mercurochrome injection had produced diarrheal stools, stained a deep red, and supposed to be bloody until D'Albora demonstrated the color to be due not to blood but to mercurochrome. The first colitis patient was a young woman 21 years of age, who had had the typical severe manifestations of the disease for nine months and whom none of the accepted treatments had seemed to help, who weighed but 70 pounds and whose hemoglobin was 45%. She was given a transfusion of 500 c.c. of whole blood, and four days later received 25 c.c. of a 1% solution of mercurochrome intravenously. The reaction was severe, the temperature reaching 102° F., and she showed a marked exacerbation of her diarrhea, with deeply red-stained stools, lasting for a day. Following this there was a marked reduction in the number of stools. She was therefore given two more injections of mercurochrome at four-day intervals and after the third dose she developed a stomatitis, and a few casts and some albumin appeared in the urine. However, the bowel mucosa promptly healed, the diarrhea stopped, the albuminuria and stomatitis proved to be only transient, and she gained 30 pounds in weight within two months. Six years later she developed an exacerbation which was promptly relieved by two injections of mercurochrome, and for the past two years she has been perfectly well. Encouraged by his success in the treatment of this case by the new method, D'Al-

bora continued to treat his patients in this way for four years before we made it the routine method in all suitable cases on our service at the Long Island College Hospital.

Our method of administration of the mercurochrome, evolved in our series of 30 cases in which it was used, is now as follows:

1. In a badly depleted and debilitated patient, one or more transfusions are given preliminary to the injections.

2. Mercurochrome is given in a .5% solution in normal saline solution, 15 c.c. being the initial dose. If this dose does not produce a febrile reaction reaching at least 101° F., 25 or 30 c.c. are used for the second dose, 4 days later. If a satisfactory reaction has occurred (we consider 101.5° to 102.5° F. the most desirable), subsequent doses, at 4 to 5 day intervals, are increased by from 5 to 10 c.c. per dose, the increase being desirable because a tolerance has been shown to be established.

Our experience with mercurochrome has led us to suggest the following contraindications to its use:

1. In cases showing evidence of definite renal pathology, the even transient irritation caused by the mercurochrome might prove to be dangerous. However, in three cases which were complicated by cystitis and pyelitis, no ill effects were observed, the bowel condition being relieved and the urine gradually clearing up after the usual treatment.

2. In senile patients with evidences of arteriosclerosis and myocardial impairment, the febrile reaction might result in serious complications. Fortunately in our experience, ulcerative colitis does not often occur in the aged, the oldest in our group of 30 patients being 42 years of age, the average, 29 years.

The effects of the mercurochrome injection were as follows:

1. A febrile reaction, the severity depending upon the dose used, in a few cases reached a temperature of 105° or 106° F. without harmful after-effect. However, we had aimed to produce a temperature of 101.5° to 102.5° F., having found a reaction of this degree to produce the best results.

2. An exacerbation of the diarrhea usually occurs within a few hours and may last for from 6 to 24 or even 48 hours, being then succeeded by a marked reduction in the frequency of the stools and in the amount of blood observed in them.

3. The stools for the first 6 to 24 hours are stained a deep red, the color being due to mercurochrome, and not to increased bleeding.

4. In fully 70% of cases there occurs a mild albuminuria and occasionally a few hyaline casts are observed, but these have invariably disappeared within 2 or 3 days.

5. In addition to the alleviation of symptoms, the improvement in the appearance of the bowel lining on proctoscopy is remarkable. The angry, sloughing, exudative surface is rapidly succeeded by a cleanly granulating appearance, and healing is very rapid. It is only in exceptional cases that more than 3 or 4 doses of mercurochrome at 4-day intervals are necessary to produce an appearance of a really smooth mucosal surface, although, of course, a perfectly normal condition of the mucosa may take a long time to appear or may never be restored. In our group of cases the largest number of injections given was 8, the smallest 2, with

an average of 3.2 injections in the whole series of 30 cases.

6. The use of mercurochrome has remarkably reduced the period of hospitalization of our patients. Whereas previously the average stay in the hospital was over three months, in our group of cases the longest period was 105 days, the shortest 8 days, and the average 41 days.

The beneficial effects of the mercurochrome treatment have been found to be just as good in long continued cases as in the recent ones. In our group of 30 cases, the longest duration of the ulcerative colitis symptoms had been 12 years, the shortest 12 days and the average 2 years. Twelve were men and eighteen women, it being noticed that men apparently applied earlier for relief, their average duration of symptoms being only one year.

SUMMARY

Having found that, in the treatment of ulcerative colitis, mercurochrome, intravenously administered, is of considerable value in hastening the healing of the lesions, and having demonstrated that it is safe to use in the doses we have found effective, we have for several years been using it routinely in all cases in which it has not been definitely contraindicated. The routine we have followed in the management of our ulcerative colitis cases is as follows:

1. General hygiene: rest, mental and physical, sunshine or ultraviolet radiation, intravenous glucose and saline solutions and transfusions, iron, calcium and, frequently, parathyroid extract.

2. Complete clinical study: a. *General*: blood examinations, including culture, renal function studies, chest examination, including Roentgen ray, dental, nose and throat, gynecological and genitourinary studies. b. *Gastrointestinal*: gastric analysis, gastrointestinal Roentgen ray studies, including opaque enema, proctosigmoidoscopy, routine stool examinations and cultures, and allergic studies, including cutaneous tests and elimination diets.

3. Diet: high caloric, high vitamin and non-allergic.

4. Eradication of all infective foci and treatment of any other coexistent disease processes.

5. Mercurochrome, intravenously administered, beginning with a dose of 15 c.c. of .5% solution and increasing the doses, at 4-day intervals, sufficiently to cause a febrile reaction of 101.5° to 102.5° F. The effect on the kidneys is carefully noted, by means of daily urine examinations and occasional functional tests.

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The Treatment of Migraine

H. Baillard insists (*Journal des praticiens*, April 29, xlvii, 1933, 281) that migraine is usually caused by digestive disturbances, and that the best method of treatment is by dieting, combined with daily doses of calomel. The diet should be chiefly vegetarian, with the addition every two or three days of fish, chicken, a lamb cutlet or an egg. In one patient one kind of meat but not another is well tolerated, and even different methods of cooking an egg suit one patient rather than another. According to the author, the best way of giving calomel is to give it daily for ten or fourteen days in 1/6 to 1/2 grain doses. Aloes in small doses is also useful for migraine, especially when constipation is present; it is quite a mistake that the continued taking of aloes in small doses causes haemorrhoids. The author has not found peptone, as recommended by Pagniez, to be efficacious. But in obstinate cases spa treatment is often successful.—*The Practitioner*.

Venous Pressure

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VENOUS pressure studies and intravenous injections of decholin (Winternitz, Deutsch, and Brüll, of Prague), calcium chloride (Hirschsohn and Mendel, and Kahler), calcium levulinate, calcium gluconate, (selvadin, afenil, calglucon, etc., may be used), fluorescein (Koch), etc., have been used in rating cardiovascular function. Frey (1902) and Gaertner (1903) suggested the estimation of venous pressure by studying the veins on the dorsum of the hand. "Wenn man den gesenkten Arm langsam und unter steter Beobachtung erhebt, so findet man, dass das Zusammenfallen der Venen bei demselben Menschen stets dann eintritt, wenn der Arm in ein bestimmtes Niveaugelangt" (G. Gaertner).

Veins are selected on the dorsum of the hand. After holding the hand in a dependent position until the veins are full, the fully extended arm is then raised *slowly* until the level of the right auricle is reached (3rd interspace). Normally, the veins collapse from the state of fullness—with the hand at this level. In cardiac difficulty, when the venous pressure is increased, the outstretched arm and hand must be raised considerably above the level of the right auricle. Venesection reduces (temporarily) this increased venous pressure. Robertson recently suggested this method as of value in the study of congestive heart failure.

Stephen H. Hales (1677-1761), in 1733, was among the first to measure venous pressure in animals by connecting an upright tube with the vein and observing how high the blood rose. F. Moritz and D. v. Tabora employed this method in humans (*Deutsch. Arch. f. klin. Med.* 98: 475-505, 1910).

Jean Poiseuille (1799-1869), in 1828, invented the mercurial manometer ("haemodynamometer"). Carl Ludwig (1816-1895), in 1847, adapted it ("kymographion") for graphic records.

Admont H. Clark, of Baltimore, concludes that "Venous Pressure measurements, when made at frequent intervals, give a definite indication of the degree, and changes in the degree of cardiac decompensation." Schopp (1912) found that venous pressure can be altered by exercise in proportion to the degree of cardiac decompensation.

In normal cases, the lowest venous pressures of diurnal variation occur at night; they are *highest* during the sleeping hours in *cardiac cases*.

Hooker (1914) noted a distinct diurnal variation under normal conditions of health and a decided fluctuation in venous pressure during the day in three surgical cases confined to bed.

Clark, in 1915, found a definite diurnal variation in venous pressure. In cardiac cases the highest venous pressures tend to occur at night, according to Clark. He found that the diurnal variation averages 2.5 cm. more in the cardiac cases than in the normal. Venous pressure was lowered in seven out of eight pleural tapings. Venesection lowered the venous pressure in three observed cases, but the subsequent rise in pressure was rapid. Venous pressure and urine output generally showed an inverse variation. Clark concludes that "Death from cardiac decompensation is preceded by a continuously high venous pressure, or a rapid rise."

Criep suggested that there may be a nervous control of the tonus of the various veins.

Hooker has demonstrated a gradual rise in venous pressure between 25 and 35 years of age, with constant decline to the age of 50. He made his readings in the *prone position*.

Criep found that whenever the pulse rate is high, due to decompensation, there is an increase in venous pressure. He found the average normal venous pressure to be 10.2 cm. of water—this average was the same in the sitting or recumbent position. He believes that *the recumbent position is the safest* for venous pressure determinations, and the readings are most constant. All cases of cardiac failure show increased venous pressure readings, between 16 and 25 cm., averaging 12.5 cm.—13 cm. Hooker and Eyster demonstrated that with returning compensation the pressure comes down to normal. Criep lowered venous pressure in cardiac decompensation with ouabain therapy; digitalis used alone did not produce such desirable results, according to Criep and Vaquez.

Eyster and Middleton, of the University of Wisconsin (1927), emphasize the value of *venesection* in congestive heart failure, consider the venous pressure an excellent index of the myocardial reserve, and state that "Venous hypertension in the absence of local causes results only from cardiac decompensation." They conclude that "Routine venous pressure determinations are, therefore, advised not only as a guide to venesection but also as a measure of its efficacy."

George Oliver (*Quart. J. Med.*, Oct. 1907, p. 59) observed that the venous pressure may be accurately measured without the aid of a blood-pressure instrument, a foot-rule or a measuring tape being all that is necessary. "If the veins on the dorsum of the hand are sufficiently visible, it is found that when the hand is held in the vertical position with the fingers extended, and is very gradually raised, the veins at a certain height above the level of the apex of the heart are seen to collapse quite suddenly. The completion of the process is definite, for the transition from a partial to a complete collapse takes place within the space of half an inch. It is observed that the veins near the fingers collapse somewhat sooner than those near the wrist; but the difference is so slight that I prefer to take *the collapse of all the veins of the dorsum* as the indication for measurement. I conclude that at the moment of the collapse of the veins the blood-pressure within them is practically nil, being balanced as it were by the force of gravity; we may therefore express this force, annulling the hydrostatic rise of the blood, in millimeters of mercury. This may be done by making a very simple calculation. If we take the average specific gravity of the blood as 1.060 and that of mercury as 13.570, the 25.5 mm. contained in one inch will represent 1.985 mm. Hg. (or approximately 2 mm. Hg.). Therefore, if we multiply by 2 the number of inches above the level of the apex of the heart at which the veins collapse, we ascertain in millimeters of mercury the venous pressure."

Oliver concludes by saying "This simple method of measuring the venous pressure has afforded me more uniform results than other methods, and as it enables one to discriminate between differences of 1 mm. it is definite and delicate. It is important to see that the pressure is not artificially raised. This may occur

through nervous perturbation, or obstruction of the venous flow by tight clothing, or even by the observer placing his hand on the forearm. *The lowering effect of cold* on the venous pressure should also be kept in mind."

It has been shown that the level of collapse is altered by the *speed* at which the arm is raised—very slowly, or rapidly. The tonus and irritability of the vessel wall and exercise of the part must be considered. The Gärtner and Frey methods of estimation of venous pressure have not come into general use because these simple methods of estimation are not sufficiently accurate.

Variations of venous pressure in conditions *other than cardiac decompensation* occur in obesity, pregnancy, menopause, pneumothorax (tuberculosis), mediastinal disease, and emphysema and dyspnea resulting from it. Kroetz (1922) showed a rise in venous pressure in pneumothorax. "Essential venous hypertension" might be mentioned.

Engorged jugular veins, passive congestion in the lungs and elsewhere, cyanosis or subcyanosis, and enlarged tender liver, etc., are usually present when the venous pressure is increased in the arm.

However, the clinical determination of the venous pressure in the arm may give earlier indications of beginning myocardial failure. In such cases *decholin (intravenous) injections* will give a delayed bitterish taste in the tongue and mouth, and indicate early circulatory failure.

While visiting (1929 and 1931) in the Rudolph Schmidt Medical Clinic, of the German University of Prague, I saw Winternitz, Deutsch, Brüll, and others use intravenous decholin injections as a useful means of rating cardiovascular insufficiency. The exact time interval from the moment of intravenous injection to the first appreciable bitterish taste in the tongue is used as the guide. This is increased in early myocardial failure.

Vaquez (1924), of Paris, says that Frey's method and Gaertner's method are both unreliable. He concludes that "It appears that at present the study of venous pressure can scarcely instruct us in the normal or deficient resistance of the heart. It must be left for the future to decide whether, by perfecting the methods, these interesting but still limited ideas are susceptible of development, and of opening to the clinician new paths in cardiac or venous pathology."

William Evans (1932), of Detroit, says "The estimation of venous pressure has not come into general clinical practice apparently because simple methods of estimations are not sufficiently accurate or because the more exact methods are not sufficiently simple."

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The Nature of Medicinal Springs

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inasmuch as subsequent physiologic-chemical and clinical tests have convincingly shown the superiority of the natural waters in their effect upon the human organism. With all his knowledge and power, man is not able to imitate perfectly the works of Nature.

America possesses a rich treasure in its mineral springs and it is possible to put this wealth to use. The great majority of the people still need to have this fact brought home to them in some emphatic manner. Spas and watering places are important for the health and well-being of mankind. Mineral springs are a national asset and any nation which fails to make wise use of these gifts of nature causes loss and damage to the economic strength of its people.

According to Public Health Reports, the following states reported severe outbreaks of chicken pox during the month of May: Mass., N. Y. and Penna. Mumps was prevalent in Mass. and Penna. There were 105 cases of ophthalmia neonatorum in Mass. Maine had 11 cases of rabies in animals. Mass. had 18 cases of septic sore throat and N. Y. had 20. N. Y. had 25 cases of undulant fever. Mass., N. Y. and Penna. had the most cases of pertussis. There were 19 cases of trachoma in Tenn.

Abdominal Sympathectomy for Congenital Megacolon with Report of Cured Case

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THIS report of a case of congenital megacolon is presented in order to emphasize the possibilities of surgical procedure in the relief of the condition. In 1927 Wade and Royle (1) reported that section of the sympathetic nerve supply of the affected bowel had produced marked relief or actual cure in cases of true Hirschsprung's disease.

Prior to this no medical or surgical treatment had been of any benefit. Operations for short-circuiting the intestinal content or for removing the colon failed to relieve the condition or actually increased the disability.

By the Royle operation the first to the fourth lumbar sympathetic ganglia and the corresponding portion of the cord were removed through a lumbar incision. The communicating branch fibres were also severed.

This operation is performed extraperitoneally and is a somewhat formidable procedure.

In 1930 Rankin and Learmonth (2) sectioned the actual nerve fibers supplying the affected bowel through an abdominal laparotomy incision. This operation seems to be the one of choice in the treatment of congenital megacolon.

It may be of interest to review briefly the anatomical and physiological factors that enter into this procedure.

The two constant pathological changes in congenital megacolon are immense dilation of the intestines and great hypertrophy of the muscular layers, particularly the circular fibers. The sigmoid is the segment usually affected but any or all of the segments of the colon may be involved.

It is important to distinguish the Hirschsprung colon, which is a congenital type usually found in children, from the acquired type of adults. Varying as they do in etiology the treatment differs radically.

No theory advanced in explanation of this condition has been fully proven but the operative procedure is based on the supposition that the sympathetic nerves of the bowel inhibit tone or the power to contract. At the same time they produce spasm of the sphincter ani. (3) Through some unknown irritant, possibly allergic in nature and acting on the fetus in utero, the sympathetic nerves are stimulated and the affected segment thereby kept in a so-called 'filling' state, being unable to empty its contents.

Fortunately for the operator the nerves which are to be sectioned are readily accessible through an abdominal approach.

The sympathetic nerve supply of the distal colon terminates in the inferior mesenteric nerve or nerve plexus. This latter is connected above with the great plexi of the abdomen and receives branches from the upper lumbar ganglia. These join to form a definite nerve immediately below the origin of the inferior mesenteric artery or at the level of the third lumbar vertebra.

The nerve carrying motor fibers to the internal sphincter is the presacral nerve, which contains all the terminal fibers of the thoracolumbar stream of pre-ganglionic efferent visceral fibers. It is surgically accessible at the level of the fifth lumbar vertebra, which it crosses in the median line to enter the pelvis. It is joined below this level by branches from the second, third and fourth lumbar sympathetic ganglia. The presacral communicates with the inferior mesenteric nerve through a large branch that passes upward over the bifurcation of the abdominal aorta.

Report of case:

The patient is a white male child of American parentage, seven years of age at the time of operation. He was first admitted to the hospital September 3rd, 1931, complaining of constant vomiting of food, epigastric pain and insufficient bowel movement for eleven days.

These symptoms had their onset three days after birth, when persistent vomiting had compelled a change from the breast to artificial feeding of milk and dextrose. From the first to the fourth year the symptoms were intermittent, but continued at irregular intervals and with increasing severity until he was sent to the hospital with a diagnosis of pylorospasm.

The Family History was negative. One sister alive and well. Father died at 51 years from pneumonia. Mother alive and well.

Physical Examination showed a poorly developed child whose mentality was dull. An X-ray study of the gastrointestinal tract revealed an immensely dilated colon, the dilation being chiefly of the sigmoid segment. No other physical defect was found. Improving under dietary treatment, the child was discharged but returned in May, 1932, with a history of attacks of obstinate constipation, vomiting and abdominal pain occurring at least once a month since discharge from the hospital. Examination now showed a doughy mass outlining the sigmoid colon, and extending from the costal margin into the pelvis, which it filled.

Under repeated enemata this mass disappeared in about a week.

At operation June 14, 1932, the patient was placed in the head down position and the abdomen opened by a long left rectus incision extending equally above and below the navel. The cecum and colon to the sigmoid were found to be normal in position and appearance. The sigmoid was much thickened and distended and lay in folds in the pelvis. When pulled out it measured 20 inches in length.

The small intestines were packed upward and the sigmoid drawn to the left. The origin of the inferior mesenteric artery was located above and the brim of the pelvis below. The posterior peritoneum was incised between these points and on separating the edges the presacral nerve was readily exposed. As is usually the case, the nerve was composed of several strands with connecting fibers, one of the strands exceeding the others in size. The communicating branches from the

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From the Surgical Division of St. John's Hospital, Brooklyn, N. Y. Presented before the Annual Open Meeting of the Brooklyn Surgical Society, March, 1933.

Leprosy: Report of a Case

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Wakefield, R. I.

A MAN, aged 45, was infected with leprosy 35 years ago in Penang. The incubation period was seven years. The disease developed when he was in this country and he had been here since that time—a prisoner in his own home—until his death.

He had the anesthetic type. For the past twenty-five years he had been totally blind. His fingers and toes sloughed off and healed. During the last twenty years he seemed in excellent health, enjoyed the radio each day and kept abreast of the times. He had a remarkably kind spirit and it was always a pleasure to talk with him. The disease had been in a stage of remission for twenty years and he had no symptoms

of any kind nor did he take any treatment during this time. His skin was apparently normal and there was no nasal discharge.

In March, 1932, a sloughing process began on the right knee and gradually continued until the knee was nearly amputated. There was a nasal discharge but the microorganism of leprosy was not found in the ulcer or nasal discharge, probably due to the excellent care he received from his family.

He had been very much emaciated for years and this continued until his death in November. He then suddenly showed signs of myocardial weakness and I have never witnessed a more peaceful death in any human being.

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fourth lumbar sympathetic ganglion were located and the presacral ligated and divided below this point. The nerve was dissected upward, dividing the communicating branches on either side, to its junction with the inferior mesenteric plexus of nerves near the origin of the inferior mesenteric artery. The superior mesenteric nerve was sectioned together with the ganglion, which in children marks its junction with the communicating branch from the first lumbar sympathetic ganglion. The sectioned nerves were removed in one piece.

The posterior peritoneum was closed by a running suture and the abdomen closed after removing the appendix, which was normal in appearance.

The postoperative course was smooth. The bowels were moved by enema on the fourth day, and from the sixth day there was a spontaneous daily movement.

It was noted that the child's temperament improved continuously until his discharge, and at present, March, 1933, he appears to be normal in every way.

In November, 1932, an X-ray study of the colon showed the gut to be almost normal in size and capacity.

He has had but one attack of vomiting, due not to colon stasis, but to ten bananas eaten at one meal.

If not entirely cured he has been greatly benefited by this type of operation.

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Non-Specific Therapy in Mental Disease

Psychiatrists recognize that there is a class of mental disorders due, not to the toxæmia of an acute fever or infection, but to the slow poison of a small residue of the infective process. Dr. T. C. Graves has made a study of these cases, and in a paper, the concluding half of which we publish this week, he gives an account of the pathology of the condition and a selection of cases which illustrates how the kind of patient he is discussing may be successfully treated. The usual origin, he says, is an attack of measles, scarlet fever, or influenza; after the patient recovers, a small area in the nose, throat, or ear remains infected. For a time it maintains a chronic leucocytic reaction which appears as nasal catarrh; when this defence fails the toxins invade the system. In patients who become certifiable the syndrome progresses through a series of neurological disturbances—anomalies of taste, vision, and balance—and metabolic disturbances which include disorders of nutrition, sleep, and heat regulation, to psychosis depending on toxic or organic changes in the nervous system. Dr. Graves describes three cycles of symptoms: depression, fear, and confusion; de-

pression is the first result of psychic invasion, and in some patients continues in a mild chronic form for many years, but when the invasion is more severe the toxin disturbs the functions of the thyroid and pituitary so that the fear reaction of the adrenals is stimulated. Thus fear and anxiety are imposed on the depression, in waves that correspond with the fluctuations of temperature in a normal subject. The psychic disturbance is at first intermittent, but the lucid intervals become shorter until the "psychotic continuation" stage sets in, with a mental state that may in a mild case be paranoid but which in others is little better than acute confusion. This chronic confusional state, Dr. Graves says, deserves the name dementia but is not due to dissolution of the neurones, and so may be cured, but recovery is slow. A second systemic phase usually sets in with pneumonia or some new infection, and the end is in a dementia which is presumably organic.

Dr. Graves attacks the toxæmia by stimulating a local reaction in the focus; by this time the disease is usually fairly far advanced: fresh foci have developed, and all the systems of the body have been poisoned for a long time. Lavage and antiseptics mitigate the toxæmia locally, and alkalis and antisera mitigate it generally. Calcium lactate in large doses by the mouth appears to stimulate a focal reaction, but the most potent weapons are said to be injections of colloidal calcium oleate, colloidal sulphur, and T.A.B. vaccine. In many cases the help of surgery is enlisted to open closed foci, drain off pus, and remove old exudates and necrotic material, but surgery has not been found sufficient without the local reaction produced by the injections. Artificial sunlight is one of the auxiliary measures. Specific vaccines are not, apparently, so efficient as the nonspecific agents. The case-records only mention the more drastic ad hoc remedies, but presumably the whole armament of general measures and, where necessary, psychotherapy were brought to bear. There are no figures to show the rarity of chronic infection of a sinus, ear canal, or tonsil in the non-asylum population. Since it became fashionable to seek toxic foci as a cause of "rheumatic" manifestations, many thousands of them must have been revealed in persons who showed no mental symptoms. It may be that yet others have no recognizable symptoms, and either lead active, healthy lives or are doubtfully subnormal; a number are susceptible to colds and influenza, perhaps some are handicapped by fluctuant depression. It is arguable that Dr. Graves's patients must have some factor which predisposes them to mental disorder or lack some resistance mechanism which ought to protect the nervous system against bacterial poisons. Research into this predisposing agency should yield valuable information.

The cases selected as representative of a considerable mass of material seem to bear a strong likeness—which, in fact, Dr. Graves himself analyzes. Some patients, it is true, tend to exaltation and ideas of grandeur rather than melancholy and persecution, but the disease seems to preponderate in the "depressive" type and not to favor the euphoric and well compensated. Dr. Graves, and his colleague Dr. F. A. Pickworth, who has done much valuable work on the insanity associated with sphenoidal sinus infection and invasion of the pituitary fossa, are to be thanked for directing attention to a class of mental disorder which has not received much notice. They make out a case for watchfulness on the part of the practitioner, so that care in early stages may avert further evils.

The Lancet

Rupture of the Cesarean Scar During Pregnancy And Labor With Review of the Literature

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Introduction

The advent of asepsis and antisepsis as fundamental principles in the practice of modern surgery created new problems for the obstetric surgeon. No longer was cesarean section restricted to cases of marked pelvic contraction alone; instead, a new class of patients came into being. There were cases of placenta previa, or cases with slight degree of pelvic contraction and large baby with weak pains, or certain cases of eclampsia, or merely physiologic incompetence of labor, in all of which cases cesarean section was deemed the best procedure in the interest of both the mother and the child. This broader application of the operation gives rise to the question, "What shall be the care of the cesareanized woman during subsequent pregnancies?" These women become pregnant again and, with a smaller baby and good uterine contractions, shall we allow natural delivery or shall we repeat the cesarean section? J. W. Williams takes issue with Breitsein¹, Couvelaire² and Marioton³, who are committed to the rule: **ONCE A CESAREAN ALWAYS A CESAREAN**, stating that "when a uterus has been sutured with care, and there is no subsequent infection, the scar will be strong enough to withstand the distention of a full term pregnancy." He bases his conclusions on records of 32 cases reported by Van Leuven⁴ with additions of his own.

Krukenberg⁵ in his classical work in the Archives of Gynecology in 1886 stated that after the old operation fully 50% of the scars ruptured in subsequent pregnancies. He reported at that time 20 cases of rupture with a mortality of 50%. This is in marked contrast to the brilliant results that followed the adoption of the Sanger principles of suture in 1882. Between the years 1882 and 1895 Sanger was able to collect 500 cases without a single rupture. In a brilliant paper by Palmer Findley⁶ in 1916, we find the literature reviewed from 1895 to 1916 with authentic reports on 63 cases. In the same year Bell⁷ brought the total to 79 cases by the addition of 11 cases. From 1916 to 1932 we have been able to record 96 other cases, bringing the total to 175 cases. When one considers the great number of cesarean sections, many of which have not been reported, this accident seems to be of comparatively rare occurrence. Yet, in spite of its apparent infrequency, the nature of the accident is so great as to warrant serious consideration.

ETIOLOGY:

After the initial cesarean section subsequent pregnancies are always viewed with more or less anxiety. If we could be certain about the complete union of the uterine wound there would be no occasion for such anxiety, because it has been demonstrated that the uterine muscle will completely regenerate in the absence of infection with perfect coaptation of the incised tissues.

In the cleanly incised and approximated wound leukocytes and red blood cells with fibrin and later young connective tissue cells separate the surfaces. Later these elements are absorbed and eventually muscle and fibrous tissue strands, separating muscle bundles, assume

the relationship observed in a normal postpartum uterus—other than thickened peritoneum which invades the myometrium. There is no scar tissue observed microscopically or macroscopically.

However, perfect coaptation may be prevented by infection; in this instance, the leukocytic infiltration and serous exudation are associated with more or less necrosis; then only that muscle tissue remains which has not become necrotic. Such a scar would at operation measure from $\frac{1}{2}$ to 2 cm. in breadth and would appear white and depressed. The tissue comprising it may be only serosa and decidua or merely a fibromuscular bridge of varying thicknesses depending on the extent of destruction or the degree of union which has taken place after operation. In addition to infection certain mechanical factors, such as the type and method of suture, with alternate relaxation and contraction of the uterus may separate the cut ends. Small hematomata are thus formed and later replaced by connective tissue. The picture in these cases is similar to the above with practically serosa and decidua alone left to stand the forces of labor.

Mason and Williams⁸ in 1910, in order to determine the strength of the cesarean scar, carried out a series of experiments with guinea pigs and cats. After operation and healing of the cesarean scar, they suspended varying weights over the uterine muscle. When rupture occurred, the uteri were examined carefully to note the point of rupture. The results obtained therein were compared to a series of cases in humans, and the conclusions drawn were remarkable as well as surprising. In every case, the muscle gave away first, and in only one case the rupture extended into the scar secondarily. The uniformity of these results leads to one conclusion, namely, that a firmly united scar is even stronger than uterine muscle and should easily be able to withstand the strain of labor, thereby confirming the clinical observations of Schauta⁹, who says that with modern closure of the wound rupture is more likely to occur outside the scar. As far back as 1904 Van Leuven⁴ collected 194 cases occurring in 137 patients; 117 were delivered again by cesarean section, whereas 32 were delivered spontaneously through the natural passage without damage to the uterine scar, thereby refuting the adage, **ONCE A CESAREAN ALWAYS A CESAREAN**.

A search of the literature has yielded many predisposing factors and contributing causes, all of which, because of the inadequacy and discrepancy between clear cut experimental evidence and clinical observation, remain as yet theories. We shall consider these in order and attempt an evaluation according to the best authorities.

1. Implantation of the placenta at the site of the scar:

Eckerstein¹⁰, Couvelaire² and Kerr¹¹ and, in modern times, Wilson¹² have stressed the implantation of the placenta in the site of the scar as an important etiologic factor in cases of rupture. Vogt¹³ found placental implantation in 9 out of 22 cases,

Prize thesis for 1933, Department of Obstetrics and Gynecology, Long Island College of Medicine, Brooklyn, N. Y.

Couvelaire² in 8 out of 9 cases, and Dohlmann¹⁴ in 8 out of 15 cases. The influence of the placental implantation has been likened to the trophoblastic function of the decidua. The embryonic elements invade the scar and reduce its strength to withstand the strain of pregnancy or labor. Williams⁸ and Losee¹⁵ maintain that in a firmly united scar the anterior implantation has no effect on the strength of the scar and in no instance has microscopical evidence been offered to prove this point. In Prusmann's case gross evidence has been offered showing the invasive action of the decidual elements. It seems, then, that with the ideal scar free from infection and technical errors, anterior implantation has no effect, but with an already defective scar placental implantation may accentuate this weakness.

2. Effect of Repeated Cesarean Section:

Repeated cesarean section has been condemned by Jardine and Opitz¹², who advocate sterilization following section. Yet many men report 2, 3, 4 and 5 sections, Charles¹⁷ having done his sixth on the same individual. This may be taken as an expression of confidence in the integrity of the scar. McPherson¹⁸, of the New York Lying-in Hospital reports 50 cases of multiple section in 42 individuals in which the scar as observed at subsequent operations was not to be seen or was described as solid. Harrar¹⁰ says that in five instances in which he had occasion to perform repeated section the scar in the uterus was represented merely as a slightly depressed white line. Findley⁶ concludes by saying that repeated cesarean section gives better results than primary section because of the presence of adhesions which wall off the general peritoneal cavity so that the abdomen can be entered without necessarily entering the general peritoneal cavity. Such a case was observed in Polak's Clinic by Findley.

3. Overdistention

The theory of overdistention was advocated by Paddock²⁰, Couvelaire² and Wayer²¹ because of the occurrence of this accident in three cases of hydramnios. It has already been shown from the experimental work by Mason and Williams⁸ that, when tension is applied to the uterine muscle, rupture will always occur in the muscle first, not in the scar. Hence, this theory is easily dismissed, except that in the presence of other causes it may be a contributing factor.

4. Imperfect Consolidation of the Scar

We deal now with a number of causes grouped under the term imperfect consolidation. Unquestionably, the condition of the scar is the all important factor figuring in rupture of the uterus. Imperfect consolidation may follow as a result of the following:

- A. Ill chosen location of the incision
- B. Infection in the uterine wound
- C. Suture of the placental site
- D. Improper suture material
- E. Imperfect method of suture

A. Location of the Incision

The relative advantage of the transverse

fundal incision, the short median Sanger incision, and the extraperitoneal and cervical incision, as regards future security of the scar, have been widely debated. In 1897, Fritsch²² introduced the transverse fundal incision as one yielding a firmer uterine wound. However, it soon fell into the discard because more than its share of failures were recorded. Couvelaire² in his report of 50 cases finds rupture in 17 with fundal scar. Vogt¹³ reported 6 fundal scar ruptures. Dohlmann¹⁴ reported 26 cases of rupture through fundal scars. As to the integrity of the scar in the extraperitoneal and cervical incisions, opinion differs markedly. Frank²³ reported 8, Sellheim²⁴ 5, Litschkuss²⁵ 12, and Rhohrbach²⁶ 93 cases of cervical cesarean without rupture. Vogt¹³ concludes that rupture of the scar in extraperitoneal operation is rare. On the other hand, Routh²⁷ says that the cervical operation is not in favor in England. Bumm²⁸, Transgott²⁹, Sellheim²⁴ and Wolff³⁰ have reported marked thinning of the scar with impending rupture. Wyse³¹ is very skeptical as to the reliability of the scars, and says that a bad cervical scar is worse than a fundal scar because of the marked thinning of the lower uterine segment in labor. Finally, considering the great number of cesarean sections with median incision and the generally good results, both from fetal and maternal standpoints, it still remains the most frequently elected operation.

B. Infection of the Uterine Wound

Infection of the uterine wound undoubtedly is the greatest factor resulting in a weakened scar and subsequently predisposing to rupture. All writers on this subject have emphasized this fact. In the cases reported by Wyder²¹, Schutte³², Myer³³ and Van Buren³⁴ infection strongly figured. Van Buren has pointed out recently, in a careful survey of the postoperative course of two cesareanized women with rupture, that infection had existed in the uterine wound as shown by the presence of fever, the result being faulty healing by secondary intention with the formation of a weak band of fibromuscular tissue left between endometrium and serosa to withstand the great forces of labor. In this connection we are reminded of how often an apparently conservative elective cesarean is done in the presence of sepsis or in the presence of latent gonorrhea when sterilization by the Porro operation would have been a wise choice. Then, too, Jolley³⁵ has pointed out that we also have to reckon with retained lochia as a source of infection which brings us to the admission of Findley⁶ that "There is no positive assurance of obtaining a perfect wound healing whatever the method of suture or whoever the surgeon. The

uterine scar is an unknown factor in all cases."

C. Suture of the Placental Site

This has been offered as one of the factors yielding a weaker scar. Kerr³⁶, Pinard³⁷ and Varnier³⁸ believe that the uterine tissue over the placental site is softer than the remainder, hence suture over this area is the precursor of a weak scar. Not many writers in the literature have stated whether the suture passed through the placental site or not. However, considering the great frequency with which the placenta is found in this location, it does not appear as a wide-spread complication.

D. Improper Methods of Suture

Wyse³¹ has shown that the increasing number of ruptures has been attributable not to the growing popularity of section *per se* but to the deviations from the Sanger method of suture. It is true that in recent years his exact technique is not followed and yet the essential principles of his method are still generally observed. These principles include the following:

1. Tier Suturing, i.e., sutures which pass through the entire thickness of the uterine musculature and are placed close together.
2. Infolding of the serosa to prevent the formation of adhesions.
3. Exclusion of the decidua in the suture to prevent its interposition between the incised muscle fibers.
4. Finally, tying all sutures tightly to allow a subsequent relaxation and contraction of the uterus without the formation of gaps in the uterine wound.

With the above conditions attained and with rigid asepsis Williams⁸ believes muscle regeneration should take place and favorably insure against subsequent rupture.

E. The Character of the Suture Material

In several instances in the literature the use of catgut has been condemned because in the alternate contraction and relaxation of the uterus the sutures have become untied. For this reason Krukenberg⁶ in his original work advised the use of silk. Yet, considering the large number of cases of rupture, how many are directly attributable to this factor? The character of the suture material does not enter into consideration provided it is sterile. Or, as stated by Olshausen³⁹ and Bumm²⁸, "A proper wound healing depends less on the material than on the method."

To sum up the question of etiology succinctly one factor stands as all important, i.e., the integrity of the scar. This is principally dependent upon the presence or absence of infection and the technique. Or, as inclusively put forth by Williams⁸, "Given a uterus which has been sutured with care to include the entire thickness of the muscle portion in each suture and to place

the deep stitches close together throughout the entire length of the wound using silk or linen, and where there has been no evidence of sepsis during convalescence, such a uterus may be subjected with safety to the distention of a full term pregnancy or even in the absence of mechanical indications of section to the strain of labor itself."

SYMPTOMATOLOGY:

In the classically described picture of rupture of the uterus, we have one of the most dramatic pictures in the whole realm of medicine. It strikes with such suddenness and effectiveness as to produce calamity for both mother and child. Nor is anticipation or modern surgical intervention at times sufficient to forestall impending disaster. We have, then, a previously cesareanized woman somewhere in the latter months of pregnancy who is suddenly taken with abdominal pain, persistent and progressively more severe, with the abdomen becoming more distended and board-like to the touch; then occurs a sudden cessation of pain and the patient goes into severe shock which becomes progressively more profound, and should intervention not be forthcoming the patient soon makes an exitus from hemorrhage and shock. Yet, if we are to wait for such classic signs and symptoms many cases shall be missed, for, as stated by Williams⁸, "In some cases the patient complains merely of malaise, grave symptoms occurring later as a result of infection or putrefaction." Hartman⁴⁰ says that "These cases seem peculiar in that the patient complains of very little pain at the time of rupture and seems less disturbed than in cases in which rupture had occurred without section." What is the reason for the great discrepancy in subjective and objective manifestations in different cases of rupture? Potter⁴¹, in his study on this subject, has correlated the symptoms with the concomitant pathologic findings. His results have yielded a scientific explanation for the striking and peculiar behavior of different types of rupture.

(1) There is a certain type of rupture which occurs at the site of an old cesarean scar. This may cause no symptoms at all. The scar simply opens and should the placenta be implanted posteriorly the membranes bulge through the rent. On examination a mass is found under the skin of the abdomen which is readily seen to fluctuate, and to contain fluid. By careful palpation one can outline the well-defined edges of the uterine scar. In this type, there is no pain; in fact, the patient may be up and about doing housework.

(2) In a second type rupture occurs at the placental site so that the placenta is pushed out into the abdominal cavity. But here we are confronted with a different picture. There is pain, severe pain, continuing until complete rupture occurs, when it ceases and the signs and symptoms of internal hemorrhage appear, viz., cold, clammy, moist skin, pallor, air hunger, anxiety, restlessness and a fast, thready pulse. These patients are apt to bleed to death unless surgical intervention is immediate.

(3) In a third type of case when rupture occurs the fetus is pushed out into the abdominal cavity and the placenta remains attached, the child acting as a tampon. Very little hemorrhage takes place. The fetus may live for some time floating among the coils of intestines. By abdominal examination, the fetal parts become more accessible to the fingers, while the uterus retracts into the pelvis and is separately made out. In this type no special harm occurs to mother or child if recognition is early and operation prompt.

(4) Finally, there is the most dangerous type, sacrificing both mother and child with remarkable celerity. Here the uterine wall is extremely thin and torn in different directions, the placenta and baby are expelled into the abdominal cavity, violent hemorrhage follows and the mother and fetus die without even an opportunity for diagnosis.

It follows, then, that a cesareanized woman is always in danger of rupture during pregnancy or labor. It is only by careful observation by the accoucheur that early diagnosis of imminent or actual rupture can be made. The signs and symptoms will be any one of the group pictures above described. Brodhead⁴¹ goes so far as to say that "If any one is called in to see a patient who is having severe abdominal or uterine pains at or near term, the abdomen should be opened at once."

PROGNOSIS:

We have already intimated the profound seriousness of rupture of the uterus with the appalling mortality to the fetus and the mother. This is well borne out by the literature. Krukenberg⁵, referring to the old operation, quotes 50%. Dorland⁴² collected from the literature from 1901-3 50 cases with a mortality of 24%. Ivanhoff⁴³ stated that in the Moscow maternity from 1877 to 1900 there had been 124 cases, of which 98 died, giving a mortality of 79%. The same author quotes Klein, who gives a 56% recovery by the operative method. Lobenstine⁴⁴ quotes 37 cases with a mortality of 73%. In recent times the mortality has been reduced to 15%. However, the fact must be considered that in the case of a subsequent pregnancy, the patient is frequently referred to experts, which accounts for the low maternal mortality. The fetal mortality is very high. In any case of complete rupture, the child always dies. In cases of incomplete rupture, the child sometimes lives. The average mortality found was 80%.

PROPHYLAXIS AND TREATMENT:

The question has arisen, shall a patient in the presence of absolute indications for cesarean section be sterilized at the first section? In the absence of pathology in the tubes or ovaries, the question of future pregnancy should be considered before performing section. The danger of repeated section with possibility of rupture during pregnancy and labor should be put before the patient plainly and, should the patient, knowing these facts, elect repeated section, she should be allowed to do so. We have already shown in a review of the literature that there is relatively little risk connected with repeated section. Should the patient be opposed to section, sterilization should be carried out.

The woman with a scar in her uterus presents a different problem. A careful study should be made by the obstetric surgeon as to the integrity of the scar as determined by her previous postoperative course, the type of operation with the technique and method of suture, and the indication for cesarean at the first section. With these in mind diligent observation should be made of the case during the latter months of pregnancy and during labor itself if this is permitted to go on. Timely, clean, elective cesarean section should be carried out when it is believed that the uterine scar is defective or obstruction to the passage of the fetus exists. There should be avoidance as far as possible of all intrauterine manipulations such as version, application of forceps, and introduction of the hydrostatic bag or tampons. Pituitrin is contraindicated. All cases that ran a previous postoperative febrile course call for serious consideration in the event of subse-

quent pregnancy. Neglect in these cases is sure to prove disastrous.

The actual procedure to be carried out will necessarily depend upon the experience of the surgeon and the findings at the time of operation. Certain procedures have an authentic background in the literature and are herewith suggested.

(1) In cases with unruptured membranes bulging through the rent of the scar after removal of the child and placenta, the edges can be dealt with by débride-ment and resutured with fair results.

(2) When the child is thrown out into the abdominal cavity and the placenta is retained attempted suture of the tear gives the best results.

(3) In the case with extensive rupture in different directions, with placenta and child expelled into the abdominal cavity, the uterus had best be removed, provided the condition of the patient warrants so extensive a procedure.

(4) When suture of the uterus is decided upon resection of the tubes should at the same time be carried out.

In the final analysis the condition of the patient, the operative findings, and the experience of the surgeon will determine the procedure.

STATISTICAL STUDY: 175 Cases

(1) *Age Incidence*: Age incidence averaged 28 years. This is merely an expression of the period of fertility during which section is usually carried out. In general it may be said that rupture of the uterus is most apt to occur during the second and third decades of life.

(2) *Indications*: Obtained in 97 cases

A. Contracted pelvis	47	Cases
B. Eclampsia	22	"
C. Placenta previa	10	"
D. Nephritis	3	"
E. Disproportion (fetal)	10	"
F. Transverse with contraction	2	"
G. Vaginal varices	1	Case
H. Carcoma of sacrum	1	"
I. Lumbokypnosis	1	"

Attention is called to those cases in which section was performed for placenta previa, disproportion and eclampsia in which the patient still retained an ample pelvis for natural delivery and in which the factors cited did not enter necessarily into a subsequent pregnancy.

(3) *Number of Sections prior to Rupture*: 109 Cases

A. First section	72	Cases
B. Second section	24	"
C. Third section	13	"

This illustrates clearly the already emphasized ease with which repeated section can be carried out without increasing the danger of rupture.

(4) *Parity*:

A. Para one	109	D. Para four	3
B. Para two	34	E. Para five	2
C. Para three	22	F. Para seven	1

(5) *Location of the Incision*: 153 Cases

A. Median	102	Cases
B. Transverse fundal	31	"
C. Extraperitoneal	30	"

(6) *Time*:

A. Full Term	110	Cases
B. Eight Months	12	"
C. Seven Months	7	"
D. Eight and one-half Months	5	"
E. Eleven Months	1	"

- (7) *Placental Site in Rupture*: Mentioned in 50 cases
 A. 41 Cases extended into or near the tear
 B. 9 Cases not in tear
- (8) *Treatment of Rupture*:
 A. Suture of wound 49 Cases
 B. Porro 24 "
 C. Vaginal hysterectomy 9 "
 D. Total abdominal hysterectomy 4 "
 E. Supravaginal hysterectomy 43 "
 F. Laparotomy and drainage 6 "
 G. Autopsy 5 "
- (9) *Results to Mother*:
 A. Recovered 83
 B. Died 31
 C. Died 4 on the 12th day
 D. Died 3 on the 16th day
 E. Postmortem 1
- (10) *Results to the Child*:
 A. Died 102 B. Lived 20

CONCLUSIONS:

(1) Rupture of the uterus in a previously cesareanized woman is a rather rare but formidable obstetric accident. Since Krukenberg's original work in 1886 we have found records of 175 cases.

(2) Etiology is principally based on the integrity of the scar which in turn is dependent upon the technique of suture and the presence or absence of postoperative infection.

(3) Symptomatology in the classic type presents an abdominal calamity followed by the signs and symptoms of shock and internal hemorrhage. Various group types are described in which the pathologic findings are correlated with the symptoms.

(4) Maternal mortality in the hands of the expert is 15%, whereas the fetal mortality averages 80%.

(5) Prophylaxis is concerned with careful observation of the patient during the latter months of pregnancy.

(6) Repeated cesarean sections give better results than primary sections.

(7) Actual treatment of a case of rupture is operative, the procedure depending upon the condition of the patient, the findings and the experience of the surgeon.

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PRA

Why not a Physicians' Recovery Act? Perhaps it might be 112 hours a week at 10 cents an hour—or something.

Diet Hint for Women

British ministry of health says a woman needs only 83 per cent as much food as a man. Why not publish this fact on the carte de jour, in letters which cannot escape attention of the party of the other part.—Rochester Times-Union.

Cancer

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The Precancerous Lesions of the Mouth

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EWING^{1, 2} reminds us that "mouth cancer is one of the most fatal of malignant diseases." Yet "among preventable cancers, the most obvious is the intra-oral group." The diagnosis and treatment of precancerous lesions of the mouth, therefore, assume unusual significance.

The term "precancerous" has been abused. It is agreed, however, that certain conditions prevailing in the mouth predispose to the development of cancer. The lesions and conditions which precede and favor the onset of malignancy in the mouth are leukoplakia, ulcers, warts, hypertrophied papillae at the base of the tongue, fibromas, adenomas of the labial glands and angiomas. There is agreement, also, that chronic mechanical irritation of the buccal mucous membrane and oral sepsis are important contributory factors.

Leukoplakia is the most common precancerous lesion. Thomas³ reports 14 cases of cancer of the floor of the mouth 50% of which showed white plaques near or beside the carcinoma and 42.8% of these cancers were directly traceable to the leukoplakia. Bloodgood⁴ describes leukoplakia as a callosity resembling a scale of white enamel paint on the moist, red mucous membrane of the mouth. Pels⁵, however, states that all white areas in the mouth are called leukoplakia and contends, therefore, that there should be a correlation of the pathological findings and the clinical manifestations. In this connection Bloodgood observes that white patches simulating leukoplakia may occur in the stomatitis of Vincent's infection or in septic stomatitis from focal infection. When the Vincent's infection is cured or the root abscess, infected tonsils or sinus infections have been dealt with the white patches sometimes disappear very slowly. Smoking appears to be the most frequent cause of leukoplakia. Eichenlaub⁶ reports 70 cases of the lesion, 68 of which, 97.1%, occurred in smokers. And furthermore, the cessation of smoking cures the leukoplakia.

Any ulcer in the oral cavity suggests malignancy. An ulcer in an area of leukoplakia is especially significant and should be immediately excised. Also any ulcer with an indurated edge, no matter how small, whether due to tuberculosis, syphilis, or the result of pressure or

injury from a tooth, requires prompt excision. Many of these ulcers of benign origin would disappear upon removal of the cause. Nevertheless, Bloodgood points out that a patient with fully developed oral cancer usually gives a history of a neglected ulcer. Therefore, small indurated ulcers in particular and, perhaps, all small ulcers should be excised as a prophylactic measure. Their removal entails no mutilation. If the ulcer is large, biopsy is indicated because the removal of these lesions is mutilating, but there is little chance of curing oral cancer when the complete excision of the ulcer means mutilation. The tuberculous ulcer is mentioned because it may simulate malignancy. It is not apparently a precancerous lesion. The small tuberculous ulcers in any event should be excised and the large ones submitted to biopsy. The tuberculous oral lesion is secondary to pulmonary tuberculosis. The primary syphilitic buccal ulcer is usually characteristic. Bloodgood, however, reports one case of syphilitic lesion at the base of the tongue which he could not differentiate from cancer. Biopsy was refused but the lesion disappeared after three weeks' treatment with arsphenamine. The relationship between syphilis and cancer of the mouth is close. And Ewing states unequivocally that syphilis is the third most frequent cause of cancer of the lip, tongue and tonsil, being preceded in importance only by bad teeth and tobacco. Observers agree that cancer of the mouth in the presence of syphilis is almost certainly fatal, and the prognosis has not been improved by any known methods of treatment.

Bloodgood notes, however, that glossitis and gumma of the tongue due to untreated syphilis are now seldom seen. Even the primary lesion and the mucous patch are rarely encountered. Bloodgood observes, therefore, that syphilis as a factor of cancer of the tongue is apparently under control in this country. Hypertrophy of the papillae at the base of the tongue is significant because it precedes malignant, syphilitic and tuberculous lesions in this area. Hypertrophy of the papillae occurs also, however, in the presence of oral sepsis. The cause of the hypertrophy should be sought for and eliminated, if practicable. Fibromas of the mouth are due to injury and are, therefore, found most frequently where the tongue, cheek or lip can be bitten. In almost 10% of the cases cancer has developed. Therefore, these tumors, even though no larger than a bird shot, should be promptly excised if they are subjected to chronic irrita-

This contribution is a part of the Clinical Conference held at St. Mary's Hospital, Rochester, N. Y., in connection with the Eighth Annual Meeting of the New York State Committee of the American Society for the Control of Cancer, December 13, 1932. Leo F. Simpson, M.D., F.A.C.S., Chairman of the Conference.

tion. In the absence of trauma from the teeth or a plate, however, it is safe to observe the growths for a few months in the hope that they will disappear spontaneously. If the tumor continues to grow and attains the size of a pea it should be excised regardless of location or of irritation. The most common cause of a wart in the oral cavity is leukoplakia, but occasionally a wart will develop within the mouth as a direct result of irritation from other sources. Warts should be excised with an ample margin because microscopical examination is the criterion of malignancy. The wart is much more likely to become malignant than is the fibroma. Adenomas of the labial glands should be excised because they are subject to irritation and are, therefore, potentially malignant. The rare hemangioma and lymphangioma of the mucous membrane of the cheek, floor of the mouth and tongue are also subject to malignant change and should be removed. The small ones are best excised. The larger growths, however, in which excision would be mutilating, may be destroyed by irradiation or coagulation.

Chronic irritation and oral sepsis are important and frequently associated etiologic factors in cancer of the mouth. Ewing, for example, states that "broken, decayed and projecting teeth continually tear the adjacent mucosa. Pyorrhea adds an effective irritant and buccal uncleanness is of great importance." Campbell⁷ observes that "a scaly spot on the lip of a smoker, or a sore opposite the site where the cigar or pipe stem is held against the tongue will, if neglected, ultimately develop into cancer." And Pettit⁸ believes that "in cancer of the oral cavity a definite history of chronic irritation can be obtained in almost every case." The dangers of oral sepsis are generally recognized but most observers stress chronic irritation as the causal factor in cancer of the mouth. Hollander⁹, however, dissents from the general opinion that the trauma of ill-fitting dentures *per se* constitutes the essential factor in the causation of cancer through pressure sores. Hollander states that his examination has revealed several nasty looking deep ulcers from ill-fitting dentures, some of the ulcers of long duration. So far, however, none of these ulcers has become carcinomatous if the patient has been edentulous for one year or over. Hollander, therefore, inclines to the belief that oral sepsis rather than trauma is the essential factor in buccal cancer. In any event oral sepsis, whenever observed, should be eliminated by a search for and removal of its source. And the causes of irritation in or about the mouth must be removed and the results, induration, ulcer or other lesion, destroyed.

In conclusion, mouth cancer is one of the most fatal of malignant diseases. Yet, it is preventable. Not only are the precancerous lesions recognizable and curable but their course is unusually long. The discovery and diagnosis of these lesions entail a careful, systematic examination of the buccal mucous membrane. With the fullest cooperation of the patient, the dentist and the doctor, the elimination of oral malignancy from the cancer problem would become an actuality.

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Discussion

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In relation to precancerous lesions of the mouth I was particularly interested in the emphasis Dr. Fowler placed upon the importance of poor mouth hygiene. Here obviously is a field in which prevention could be practiced, and yet I know of nothing one more commonly sees in both clinic and private work than poor oral hygiene. It seems that the average patient is unwilling to spend any time on his teeth and gums, would in fact rather lose all his teeth than have even minor repairs or prophylactic work done.

I am forced to disagree with Bloodgood's assertion that lesions due to syphilis, early and late, are not being seen in the mouth. One does not commonly see chancres, but mucous patches are very common; and glossitis is fairly so. In a study of the serology in patients subject to carcinoma of the tongue, Belote recently discovered positive bloods in thirty per cent. In another study he found an increased incidence of positive serologies in all cancer patients, particularly cervix, 15.1; vulva, 11.8, lip, 8.8. The routine serology on all hospital patients was six per cent. These facts seem to me significant.



106TH REGULAR MEETING TUESDAY, OCTOBER 24TH

This particular date has been selected as it does not conflict with the stated meetings of the four county societies, Suffolk, Nassau, Queens and Kings.

The meeting will be held in Nassau County, probably at one of the clubs centrally located, to be announced later.

There will be an excellent dinner served, a worthwhile scientific program, and only a very brief executive session.

Role of Diiodotyrosine in Hyperthyroidism: Comparison of Therapeutic Effect of Diiodotyrosine with Inorganic Iodine

Alexander B. Gutman, Lawrence W. Sloan, Ethel Benedict Gutman and Walter W. Palmer, New York (Journal A. M. A., July 22, 1933), prepared thirty patients with hyperthyroidism for thyroidectomy by administering diiodotyrosine. They were more impressed with the similarities than by the differences between the response of hyperthyroid patients to diiodotyrosine and to other iodine compounds. The effects are indistinguishable as to time of onset of remission, the period required for maximum response, the duration of remission, the exacerbation when medication is discontinued, the response when again administered, the ultimate development of a refractory state, the success of intermittent dosage in mild cases, and the characteristic clinical, metabolic, histologic and chemical changes common to the two. The conclusion that the effects of diiodotyrosine and of inorganic iodine are essentially the same appears justified. It has been suggested by Abelin that the effects of iodine in hyperthyroidism are due to the influence of diiodotyrosine that is formed. Ignorance of the intermediary iodine metabolism of the thyroid makes it impossible to prove or disprove this assumption. Diiodotyrosine has not been conclusively shown to have any physiologic activity that could be regarded as antagonistic to thyroxine. The lowering of the basal metabolic rate of animals fed thyroid by added diiodotyrosine was not observed by Kommerell in dogs or in the authors' laboratory in guinea-pigs. Diiodotyrosine does not lower the basal metabolism of normal animals, as might be expected of a substance having an effect antagonistic to thyroxine. One might expect, furthermore, that administration of thyroxine in the form of thyroid gland, which also contains a large proportion of diiodotyrosine, would not produce as great an effect on the metabolism as an equivalent amount of thyroxine in the form of the free amino-acid. That this is not the case is well established. The authors point out that the only definite physiologic activity that diiodotyrosine has been shown to possess is the acceleration of metamorphosis in amphibia, in which respect it acts like thyroxine.

Economics

Department Editor: THOMAS A. MCGOLDRICK, M.D.

CHAIRMAN COMMITTEE ON ECONOMICS OF THE MEDICAL SOCIETY OF THE COUNTY OF KINGS, BROOKLYN

Social Justice and the Doctor

WHEN laws for the compensation of workmen injured in industrial life were being enacted the medical profession was conspicuously absent. Representatives of employers, of labor unions, and of insurance carriers, as well as social workers, were always present and took marked interest in framing these laws. Their interests were decidedly selfish—in the case of most of them entirely financial, and the right quality of medical care for the injured man, when and where he would secure it and his restoration to perfect health—the main interest of the law—were in the absence of the authoritative voice of the profession barely discussed or relegated to some subordinate position. It is not surprising, then, that in the constitution of boards to administer the law dealing with injured people physicians were not represented. It is only now after many years of administration that the important place of the physician is being recognized, and a realization reached that the many mistakes and failures of these years could have been averted if his special knowledge and experience had been adequately used. It does not seem likely that the medical profession will again neglect to take its proper stand on all those social questions which affect the people of this country nor fail to contribute its thought to the solution of the problems. Aggregations of wealth, social workers, and professional uplifters have shown us in the past few years how eagerly they seek the control and regulation of matters with which the doctor is most intimate and from which, in their plans, he would be almost completely excluded.

There has been no study, investigation or survey of sickness but has found and admitted that a very great proportion of the people do not receive for their labor enough money to secure the necessities of life. Even if these people were to faithfully labor seven days in the week and twelve or even more hours per day they could not earn a sufficient amount for that purpose. It requires no demonstration to anyone to show how much can be purchased by an adult who receives for a full week's work \$3 or \$8 or \$12 or \$14, and these wages are not being paid in far off towns or hamlets but in our leading cities, including New York, as the reports of the Industrial Commissioner reveal. For an honest day's work every person is entitled to a living wage and that wage does not mean the mere holding of body and soul together. It means in addition to food and clothing and shelter, care in time of sickness and unemployment; it means time for home and family; it means time to pursue in leisure some other activities than those of his daily labor. It must mean that the man is neither machine nor a beast of burden. In the knowledge he has gained in the homes of the sick underpaid laboring people, and of the resultant physical loss to individual and community, the doctor should gladly welcome those principles enunciated in the National Recovery Act and give all his aid to the accom-

plishment of its purposes. To him the maximum hours of labor, the minimum amount of money paid and the collective bargaining by employees which are the most important requirements of the Act are but elementary, are based entirely on simple justice and fair play, and have been successfully carried on today by many, though all too few, employers. On this social question there is but one side for lovers of justice. It is not simply to overcome this depression that the doctor is keenly interested but it is his hope and belief that after the depression the condition of labor will not revert to its former level.

It will be difficult for many employers to willingly accept a plan which seems at first to reduce their income, to divert some of the profits of industry from the few to the many, even though a more equitable distribution follows. By subterfuges, by juggling of time sheets, by splitting days, by adding expense items to their lowest grade employees, the purposes of the Act may be thwarted. When workmen's compensation was under consideration the favorite argument in opposition was that industry could not stand the cost, yet the public has borne it. The very same argument is again presented and there will be the same answer. The most puerile of all the objections to the Act has been that the workingman would not know how to profitably use his added leisure, and already suggestions are being made to properly instruct him. The thought arises of the ways in which leisure time is used by many who now receive the greater part of the profits of industry and whether instruction might not be given with benefit to them. If the most effective remedy against abuses is public opinion the doctor from his daily experience with social conditions will learn many facts that will help mould that public opinion. Publicity of violations learned in his day's work and instruction of the public in the relationship between sickness and insufficient income will be of great assistance.

There have been many points in the code which touched directly on the work of the doctor in his private practice, and on his work in the hospitals. The first announcement seemed to bear harshly on doctor and hospital but later official explanations have cleared away the doubt. All professional employees, doctors, technicians and hospital staffs are not affected by the Act, but clerical employees in hospital, clinic or office do come under its provisions. In the purchase of supplies for his work the ruling has been later interpreted that the doctor is not to be regarded as a strictly retail customer but is entitled to those discounts which have always been due him. The ruling, submitted by the pharmacists themselves, to prohibit all prescribing by non-medical graduates, and to be strictly enforced by the pharmacists, will be found of great service to the

(Concluded on page 320)

Contemporary Progress

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Medicine

Undernutrition and its Treatment by Adequate Diet

J. M. Strang and F. A. Evans (*Annals of Internal Medicine*, 7:45, July, 1933) report a study of 41 cases of acute and chronic undernutrition which were treated by diet and a regimen to reduce the energy output. The patients treated ranged in age from ten to sixty-one years; the majority were adults. All were 15 per cent or more underweight, i.e., below the ideal weight for their age and height; 20 were treated in the hospital and 21 were office patients. In addition to their underweight these patients presented a variety of other symptoms, such as palpitation, dizzy spells, nervous irritability, insomnia, fatigue and weakness. Of the 41 cases treated all but 2 hospital patients showed definite gains in weight and were relieved of symptoms. The failure in these 2 cases resulted from their inability to take the prescribed diet. The diets used were high caloric general mixed diets with no specific food deficiencies; the caloric values necessary were found to be from 3,000 to 3,500 calories for adults; the protein intake was usually fixed at 1 gm. per kg. of ideal weight. Both high fat and high carbohydrate diets were used; the high carbohydrate diets were found to be more palatable, but were too bulky for some patients; a diet of moderate bulk, however, was sometimes of distinct advantage. The patient's work was much reduced or preferably entirely suspended, and rest periods for an hour after each meal in addition to at least nine hours rest at night were required. From their study of these cases the authors conclude that undernutrition is a result of a food intake inadequate in comparison with the energy output. The evidence does not indicate that such factors as heredity, endocrine dyscrasias and central nervous system disorders are essential causes of undernutrition. Undernutrition can be corrected by using a diet of high caloric value and reducing energy output, thus securing "an adequate positive energy balance."

COMMENT

In estimating the caloric value of food it is surprising to see how many patients attempt to live on 1500 calories a day. Each patient's diet should be analyzed as to calories and vitamins. In these vitamin days, calories have been forgotten.

M. W. T.

The Histamine Test

W. S. Pollard (*Archives of Internal Medicine*, 51:903, June, 1933) reports a study of gastric acidity and volume of gastric secretion in 988 tests with histamine injected hypodermically. Of the persons tested 684 showed no evidence of disease. In this normal group the mean total acidity for male subjects ranged from 101.1 units at the age of twenty-five to 67.1 units at the age of sixty-five; the mean total acidity for females from 82.2 units at twenty-five to 66.7 units at sixty-five. This included normal subjects who showed anacidity. In the males, there was a definite correlation between age and gastric acidity. The mean maximum ten minute volume of gastric secretion in normal males ranged from 39.7 c.c. at the age of twenty-five to 24.9 c.c. at the age of sixty-five; in normal females from 33.1 c.c. at twenty-five to 21.7 c.c. at sixty-five. In both sexes the total volume of gastric secretion declined with age at about the same rate. There was a steady increase in the incidence of anacidity from youth to old age, and at all age periods up to sixty years the incidence was highest in females. In 130 cases of duodenal ulcer, 91.3 per cent showed a total acidity and 79.2 per cent a volume of secretion above the mean normal for age and sex. In 36 cases of gastric ulcer, 91.7 per cent had a total gastric acidity and 75 per cent a volume of secretion above the normal mean for age and sex. In 56 cases of carcinoma of the

stomach, there was an acidity in 69.6 per cent, and only one patient showed a total acidity above the normal mean; only 3 patients in this group showed a volume of gastric secretion above the normal mean. In a miscellaneous group of cases there was no characteristic type of gastric secretion associated with any disease except pernicious anemia, in which complete anacidity is the rule. The histamine test, the author claims, fulfills the recognized criteria for an adequate functional test; it is standardizable; it imposes a maximum load on function; and it yields pure gastric juice suitable for quantitative measurement. Yet the results of this test in this series of cases, in agreement with the results of other investigators, show that the normal range of gastric acidity is so great that it gives information of diagnostic value only when the variation from the normal mean is extreme.

Antivenin in Thrombocytopenic Hemorrhage

K. P. A. Taylor (*American Journal of Surgery*, 21:285, August, 1933) notes that in 1929 he, in collaboration with H. C. Clark, reported a case of thrombocytopenic purpura hemorrhagica successfully treated with the antivenin of *Bothrops atrox* (fer de lance). He now reports a second case of severe epistaxis with some bleeding from the gums, low platelet count and bleeding time sixteen minutes. After three injections of the bothropic antivenin (10, 5 and 7 c.c.), the hemorrhages were completely controlled, the platelet count increased to 230,000 and the bleeding time reduced to six minutes. In addition to these 2 cases, the author tabulates 5 other cases of thrombocytopenic bleeding and purpura reported in literature in which antivenin was used in treatment. Of these 2 recovered and 3 died; in the fatal cases crotalin antivenin was used in 2 cases, a type not specified in one case. In the 2 cases that recovered bothropic antivenin was used in one case, as in Taylor's 2 successful cases, and crotalin antivenin in one. In these 2 cases reported in literature that recovered and in Taylor's first case, the patients' condition was very serious, "apparently hopeless", when the antivenin was given. Bothropic antivenin is apparently superior to crotalin antivenin in these cases; this is explained on the basis that bothropic venom disturbs capillary permeability to a greater extent than the venom of North American snakes. The bite of the fer de lance causes hemorrhagic symptoms almost constantly, while North American venoms do not. The bothropic antivenin would thus most probably contain antihemorrhagins and antihemolysins in greater quantities.

The Role of Vitamin B in Diabetes

M. Labbé, F. Nepveux and J. D. Gringoire (*Bulletin de l'Académie de médecine*, 109:689, May 23, 1933) have found in animal experiments that vitamin B plays an important part in carbohydrate metabolism; animals fed on a diet deficient in vitamin B show disturbances of carbohydrate metabolism similar to those of diabetes; while animals receiving an excess of vitamin B store an excess of glycogen in the liver. On the basis of these findings and the results reported by others with the use of vitamin B in diabetes, the authors have treated 11 cases of diabetes with a vitamin B preparation in powdered form given by mouth. In all these cases the disease was of a severe form; the diet was carefully regulated and weighed. In 8 of the 11 cases the use of vitamin B resulted in a marked diminution of the glycosuria and in an increase in the carbohydrate tolerance. In these cases with 15 gm. of the vitamin powder daily the increase in carbohydrate tolerance ranged from 25 to 66.83 gm. in an average of forty days; in 5 cases the glycosuria was reduced from the first, in the other 3 cases more gradually. As the improvement with vitamin B is slow but progressive insulin should be given in full dosage when the treatment is first instituted; with the continued use of the

vitamin preparation, the dosage of insulin can be much reduced, or it may be stopped entirely, according to the severity of the disease. In one case in which there was no reduction of the glycosuria, there was nevertheless a stabilization of the carbohydrate metabolism so that the patient did not have repeated hypoglycemic reactions as previously. In the other 2 cases that showed no improvement, the disease was of a severe type and the period of observation relatively short.

COMMENT

It is quite necessary to use a standardized preparation of vitamin B. Each gram should contain from 12 to 15 inclusive Sherman units of vitamin B1 and the same number of Sherman units of vitamin G (B2). In adult cases it requires months of medication with vitamin B before any results are noted.

M. W. T.

Metabolism and Treatment in Arthritis

L. Martin (*Southern Medical Journal*, 26:699, August, 1933) reports metabolic studies in 65 patients with chronic arthritis. On the basis of these studies and the clinical findings and history, 43 of these cases were classed as metabolic arthritis and 9 as infectious arthritis, while 12 could not be definitely classified. In all but 8 of the metabolic group the basal metabolism was normal. In 50 per cent of this group there was a lowering of sugar tolerance, in 40 per cent an abnormality of purine metabolism; 30 per cent showed an abnormality of both carbohydrate and purine metabolism. These patients in the group of metabolic arthritis were treated chiefly on a dietetic basis. Of the cases with a low sugar tolerance, 70.5 per cent were clinically cured on a carbohydrate low diet; of the cases with abnormal purine metabolism and normal sugar tolerance, 66 per cent were clinically cured and all but one improved; a fourth were on a low purine diet, a third on a low carbohydrate diet, and the remainder on a combined low diet. Of the cases with both low sugar tolerance and abnormal purine metabolism, 76.9 per cent were clinically cured on a combined low diet. In the 8 cases with a low basal metabolism (less than 20 per cent), thyroid extract was given in addition to the diet indicated; 6 of these were among those showing the best results. Of the 4 cases with normal sugar tolerance and purine metabolism, only one showed any improvement.

COMMENT

Many times when the basal metabolism rate is normal, thyroid in small doses will improve the general health of the patient. We often overlook the fact that small doses are quite efficacious at times; even in such small doses as 1/10 grain, or even 1/100 grain, the patient's metabolism will improve.

M. W. T.

Surgery

Electrosurgery

H. Lilienthal (*Annals of Surgery*, 97:801, June, 1933) reports the use of electrosurgery in a total of 118 operations on the thorax and abdomen. On the basis of his results, he concludes that the rapidity and perfection of healing in cutaneous wounds depends on the speed with which the incision is made. With the instrument which he employs with extremely frequent oscillations, the rate of healing is equal to that of wounds made with the scalpel; the firmness of the immediate adhesion of the cutaneous edges is equal to that of the ordinary surgical wound; and the wound made with the electric cutting instrument is more likely to be aseptic than one made with the scalpel. The histological appearance of wounds made by electrosurgery differs from that of the ordinary surgical wound, but this difference does not indicate tensile weakness "or any other undesirable quality." In checking hemorrhage, electrocoagulation is as satisfactory for the control of bleeding from smaller vessels as ligation and "much more speedy." Large vessels, however, should be ligated. The author has found that electric section is not suitable for avascular tissues, such as the aponeurosis. In operations on the abdomen, he has occasionally used the electric knife in dividing adhesions or in ablating organs, but does not employ it as a rule for operating on abdominal organs, although it may be employed to advantage for the skin incision. In hernia operations, because the electric knife is "truly antiseptic," its use for skin incisions is a distinct advantage. The author concludes that electrosurgery is of value in many surgical procedures where healing by first intention is desired, and not merely for the removal of malignant growths, for which it has chiefly been employed.

Diagnostic Importance of Biliary Crystals

H. A. Rafsky (*American Journal of Medical Sciences*, 185:851, June, 1933) reports a study of the biliary crystals in the bile in 69 patients who subsequently came to operation at the Lenox Hill Hospital, New York city. It was found that in 63 cases, or 91.3 per cent, the presence of cholesterol crystals and calcium bilirubinate pigment in the pre-operative bile indicated the presence of cholecystitis (calculous or non-calculous). Calcium carbonate crystals were also found in 2 cases with stones. On the other hand cholecystography by the oral method indicated the presence of gall-bladder disease in only 56 cases. It was not always possible to differentiate between calculous and non-calculous cholecystitis by study of the biliary crystals in the bile, but as a rule the amorphous type of calcium bilirubinate pigment or "calcium bilirubin crystals" was found most frequently in cases without gall-stones, while the granular type of calcium bilirubinate pigment, or "bunch-berry" crystals, occurred with equal frequency in patients with calculous and non-calculous cholecystitis. The crystals found in the bile pre-operatively were found to be the same as those present in the stones or the gall-bladder bile removed at operation. The author is of the opinion that *bile microscopy is a valuable aid in the diagnosis of gall-bladder disease*, and should be employed more frequently in cases with more or less persistent gastric symptoms. In some cases diagnosis may be made by this means alone.

Post-Operative Urinary Retention

C. G. Jordan (*Annals of Surgery*, 98:125, July, 1933) notes that post-operative urinary retention not due to failing renal function or to organic obstruction has occurred in 12.5 per cent of a series of 644 operations under general anesthesia at the University of Pennsylvania Hospital. The highest incidence was in abdominal operations (18.6 per cent.). A study of these cases led to the conclusion that several factors were involved in the causation of post-operative urinary retention; in different cases one factor or another may predominate. The reflex of micturition in these cases is disturbed by: (1) Vegetative imbalance, in which the anesthesia, post-operative medication, and proctoclysis may all play a rôle; (2) mechanical interference with the abdominal pressure, or what the Germans call the "Bauchpresser;" and (3) by psychic factors. The treatment that has been adopted in post-operative urinary retention is based on these three factors. Vegetative imbalance is combated by stopping proctoclysis and giving potassium acetate by mouth, as this drug is a parasympathetic stimulant and increases the tone of the detrusor urinae (of the bladder) and is also a diuretic; the mechanical factor is combated by pressure over the lower abdomen and by deep inspirations; and the psychic factor by suitable psychotherapeutic measures. By this treatment, the percentage of cases of post-operative urinary retention requiring catheterization has been reduced from 90 to 28 per cent.

The Chlorides in Operative Shock

F. Legueu and his associates (*Bulletin de l'Académie de médecine*) have made a special study of the blood and urinary chlorides after operation. They find in all cases that the blood chlorides are diminished, but that the excretion of the chlorides in the urine is also diminished. This indicates, therefore, that the tissue chlorides are increased. Animal experiments have shown that there is increased chloride fixation in any tissue that is injured. There is, therefore, a fixation of chlorides in the organs and tissues injured by the operative procedure, with a resulting diminution of chlorides in both blood and the urine. The diminution of blood chlorides is associated with some degree of nitrogen retention, evidently because the diminution of blood chlorides interferes with the conditions necessary for normal function of the kidneys. When the kidneys are in good condition, the normal balance of the blood chlorides and blood nitrogen is usually re-established within a few days. If the renal function is not entirely normal or is easily disturbed, the condition becomes aggravated and a serious degree of hypochloridemia and nitrogen retention may result. This is best overcome by saline (sodium chloride) injections, which rapidly restore the chloride balance.

Effects of Laparotomy on Lung Volume

H. K. Beecher (*Journal of Clinical Investigation*, 12:651, July, 1933) has found that the measurement of the subtidal volume by Christie's method is best adapted for the study of post-operative changes in lung volume, as it can be used in patients who are weak and ill without requiring any co-

operation on their part. In his study of lung volume following laparotomy by this method, the author finds that the subtidal volume is significantly reduced below normal—by one-fifth. In patients in which this reduction of subtidal volume was found, there was no evidence of either massive collapse of the lung or of local total collapse, on physical or roentgenological examination. The author infers that the collapse was, therefore, diffuse and partial; and while it caused no symptoms of atelectasis, it may be that some of the "usual" post-operative manifestations, such as rise in pulse rate and rapid and shallow respirations, are due to this form of partial collapse. Previous studies have shown that "crippling of the respiratory mechanics," as indicated by a decrease of vital capacity, precedes this diffuse type of collapse.

Special Methods of Anesthesia

J. S. Lundy (*Minnesota Medicine*, 16:402, June, 1933) discusses various types of special anesthesia employed at the Mayo Clinic. Sacral block has been used since 1920, and from July 1, 1924 to July 1, 1932 was employed in 7,134 cases. This method gives anesthesia for operations on the perineum and genital organs, on the uterine cervix, but not the fundus, on the rectum but not the peritoneum. Procaine is used as the anesthetic, and with careful technique, the author has seen practically no untoward results; "relaxation is good, anesthesia is good and breathing is quiet." Spinal anesthesia has been employed at the Clinic in 7,891 cases up to July 1, 1932. Procaine is the anesthetic of choice. With the uniform technique adopted, untoward results are reduced to a minimum. Important factors in this technique are: A dosage based on the weight of the patient, reduced in debilitated patients, a solution not exceeding 5 per cent., and rate of injection about 0.5 c.c. per second. Another special method of anesthesia that has been found useful is Magill's method of intratracheal anesthesia, as this facilitates the administration of a general anesthesia, quiets respiration, induces relaxation and facilitates the control of the patient.

Urology

Value of X-Ray Treatment in Malignant Tumors of the Testicle

E. L. Peirson, jr. (*New England Journal of Medicine*, 209:291, Aug. 10, 1933) reviews a series of 45 cases of malignant tumor of the testicle treated at the Massachusetts General and the Huntington Memorial Hospitals (Boston) during the ten-year period prior to 1929. Thirty-two of these cases were given deep X-ray treatment. At the present time at the Massachusetts General Hospital a minimum of at least two erythema doses (1600 R units) is given through each of four portals of entry in a three month period, using 200 kv. and 4 ma. at a distance of 50 cm., with a filtration of 0.5 mm. copper and 4 mm. celluloid and a field 20 cm. square. In many of the earlier cases in this series the dosage was inadequate according to this standard. Of the 32 cases treated with the X-rays, 23 had demonstrable metastases at the time irradiation was begun. In these cases, the metastatic growths not infrequently disappeared entirely; in other cases they were reduced in size, symptoms relieved, and the patient's condition much improved. These cases, the author believes, cannot be cured, but the patient is rendered much more comfortable, and in some cases in which adequate dosage was used, life has been prolonged. In a small series of 9 cases treated by simple castration followed by irradiation, 7 are living and well four years or more after operation; while of 15 cases operated without irradiation, only 3 are living without recurrence four years or more after operation. While this series of cases is small, the author considers that the results are significant as indicating the value of the X-rays in the treatment of malignant tumors of the testicle either in inoperable cases or as an adjuvant to operation in operable cases.

COMMENT

It is a very fine indication of progress toward giving the sufferer from malignant disease all and every means available, to find urologists are at last awakening to the advantages of cross fire and multiple field, fractional doses of X-ray. The next step is the use of the advantage of preoperative irradiation and the final step is to continue this treatment for two years after operation. The doses, frequency and intervals of the irradiation are determined by the reaction of the patient's skin and the deep field of operation. It is now reasonably safe to say that 1000 cases treated in this way will be vastly better at the end of three or four years than 1000 cases treated by operation only.

V. C. P.

Renal Functions in Persons with Only One Kidney

L. B. Ellis and Soma Weiss (*American Journal of Medical Sciences*, 186:242, August, 1933) report a study of renal function in 12 patients who had had a unilateral nephrectomy done. Of these 9 had no symptoms of cardiovascular or renal disease after the operation. Three had complications, 2 of these patients a pyonephrosis involving the remaining kidney, and one hypertension. The tests employed were urea and creatinin clearance, concentration and phenolsulphonphthalein tests. In the 2 cases studied two weeks after operation and again four or five months after operation, the results of the tests were practically identical at both examinations. In both cases the urea and creatinin clearances were at the lower level of normal, the maximum concentrating power was possibly slightly diminished, but the total fluid excretion was normal and the phenolsulphonphthalein excretion was excellent. In 2 of the other cases all the functional tests gave normal results (at twenty and at four months respectively). In the remaining 5 cases without complications one or more of the tests gave slightly abnormal results. In 3 of these cases the concentrating ability of the kidney was below normal, and in 2 cases the creatinin clearance was below normal, while the urea clearance and concentrating ability were normal. In the 3 cases with complications all the tests gave low results. These findings indicate that the renal functions of persons with one kidney is adequate, unless some complicating disease develops in the remaining kidney. The results of the tests, the authors claim, also support their conclusions as to the value of urea and creatinin clearance tests in detecting early reductions in glomerular function and of the concentration test as a measure of tubular resorptive power.

COMMENT

These authors do not accentuate the compensating activity of the skin in the borderline and unfavorable cases. In my own observation and practice cutaneous elimination through graduated exercise, Turkish and allied baths and autocondensation is of extreme importance and service in balancing the functions of the body against the absence of one kidney. Quite obviously, given a patient in average good general health, even with one kidney, that organ will give normal or supernormal results to chemical elimination tests. The skin cannot possibly be neglected in most or all these cases.

V. C. P.

Variations in Kidney Pelves

D. K. Rose and his associates at the Washington University Hospital, St. Louis (*Surgery, Gynecology and Obstetrics*, 57:1, July, 1933) report a study of 385 pyelograms and case histories in regard to variations in the renal pelvis and the relation of such variations to renal disease. In this study they have found that kidney pelvis "generally accepted as normal" can be so shaped and so related to the renal parenchyma as to interfere with the free flow of urine to some extent. Such pelvis they term "dysuric." Important dysuric factors are: Degree of ptosis or rotation of the kidney; shape and size of the kidney; opening of the hilus; undesirable superior or inferior ureterocalycine line, i.e., the line from the superior minor calyx over the pelvis to the ureter and the line from the inferior minor calyx to the lower surface to the ureter, respectively; the number, size and distribution of the minor calyces and their relation to the major calyces; size and angle of entrance of minor calyces into major calyces, of major calyces into the pelvis, and of the pelvis into the ureter; ratio of the capacity, shape and location of the pelvis to those of the calyces. The association of two or more dysuric factors may result in marked dysfunction of the pelvis. In the series studied, there were 79 cases in which there was no renal disease; of these only 17 showed a dysuric type of pelvis, and in these cases the abnormality was of slight degree. In the remaining cases with some renal disease, including calculus, tuberculosis, nephropotosis with or without infection, and essential hematuria, a dysuric type of pelvis was found in a great majority of cases. The authors conclude, therefore, that a dysuric type of pelvis permits urinary stasis in all or part of the pelvis, which is an important factor in the causation of such renal diseases.

COMMENT

Just as modern teaching regards the urinary bladder as a collecting sac and as the victim of disease brought to and into it rather than arising distinctly and independently in it, so the kidney pelvis are collecting pouches into which the urine is excreted before they void it through the ureters into the blad-

der. As in the urinary bladder, so in the pelvis, the slightest obstruction to regular and above all complete evacuation, whether through anatomical deformity or defect or pathological process, leads to disease of the pelvis. Through the work of Bassler it is known that, for example, the *Bacillus coli* is excreted in the urine without lesion until obstruction to evacuation induces decomposition. Then the vicious circle begins: obstruction, decomposition, infection, and disease begins in the bladder or pelvis, as the case may be, both as collecting and evacuating pouches.

V. C. P.

Action of Avertin on the Ureter

J. A. Waddell (*Journal of Urology* 29:707, June, 1933) reports a study of the effect of avertin on the excised ureter and on the intact ureter in dogs. It was found that in perfusion experiments on the excised ureter, avertin actively depresses the musculature, producing decrease in tone and rhythmic action and increasing patency. In the living animal, avertin introduced into the ureter or given intravenously or rectally also reduces the tone and rhythmic action and increases the patency. Ureteral spasm induced by other drugs (barium and potassium salts) is overcome by avertin administered by any of these routes. The author notes also that avertin does not injure the ureter, as the effects are immediately abolished when the drug is withdrawn. On the basis of these findings he suggests that avertin may be useful in urological work to reduce ureteral spasm or in other conditions where relaxation is desired.

COMMENT

Any means of medication which will check and correct spasm of the bowels, illustrated by colic or ileus, in a certain sense belongs to the category not only of antispasmodics but also of anesthetics, in a practical sense. The more indifferent to investigation, examination and treatment a part of the body may be the better for the judgment of investigation, the diagnosis of examination and the results of treatment. So far as the ureter is concerned avertin may be such a medication.

V. C. P.

Renal Infections in Prostatic Obstruction

H. H. Young (*Bulletin of Johns Hopkins Hospital*, 53:1, July, 1933) notes that the most important predisposing cause of renal infection in prostatic obstruction is the obstruction to the outflow of the urine from the ureters into the bladder; in this, as he has shown in previous contributions, the trigone plays an important part. In prostatic obstruction infection may reach the renal pelvis by passing from the bladder up the ureter, either by direct extension from the vesical mucous membrane to that of the ureter, by infection of the urine retained by stasis in the ureter, or by a definite reflux. Infection may also reach the kidney by the lymphatics, either those accompanying the ureter or the general retroperitoneal system of lymphatics; or renal infection may be due to transmission through the blood stream of the organisms present in the urethra, the prostate or the bladder. In the prevention of renal infection in prostatic obstruction, rigid aseptic precautions in catheterization should be observed. Large quantities of water are given both before and after the operation for removal of the prostate, either by mouth or, if necessary, by hypodermoclysis or *per rectum*; if there is any uremia, injections of salt solution or 5 per cent glucose are also given intravenously. In cases where the infection is mild and strictly localized and fever and pain are moderate, this "water cure" may prove sufficient. If the infection is more severe and the fever more pronounced, a 1 per cent solution of mercurochrome is given intravenously, whether there is a septicemia or not. In giving many thousands of intravenous injections of mercurochrome in this solution, Young has found that it is the most effective method of treating upper urinary tract infections. The dosage used is 10 c.c. at first, increased by 2 to 3 c.c. at each injection, injections being given at intervals of two to three days; as a rule not more than four or five injections are necessary. This treatment does not cause nephritis; it is more effective in acute than in chronic cases; mercurochrome appears in the urine in strongly inhibitive concentration within an hour; and the intravenous injections can be combined with local treatment to good advantage.

COMMENT

Two curious things in studies of infection of the kidney in prostatic obstruction which I have never seen mentioned (in their correlation) are (a) the deformity produced and (b) the hydraulic principles. Beyond question the prostatic enlargement overcomes the control of the ureter by its muscle outlet. In other words and in general terms this muscle is "paralyzed"

exactly as the sphincter ani is "paralyzed" for pile operations. In the recumbent position the bladder against the rectum is at or below the level of the kidneys, ureter and pelvis. If and when the prostatic bladder becomes full or distended the hydraulic level is two, three or four inches above the level of the kidneys. Small wonder that this ascending hydraulic pressure with the infection of obstruction involves the kidneys.

V. C. P.

Pediatrics

Alimentary Intoxication in Infants

H. Cohen, P. R. Miller and B. Kramer (*Journal of Pediatrics* 3:299, Aug., 1933) report a study of 9 cases of alimentary intoxication in infants treated by the administration of 5 per cent glucose in normal saline solution by continuous intravenous drip. All of these infants showed the characteristic symptoms of alimentary intoxication—toxicity, dehydration, some clouding of the sensorium, often coma and hyperpnea (in 5 cases); 7 of the 9 patients were seven months of age or under; 7 had otitis media and 2 pneumonia. All had severe diarrhea, and vomiting had occurred in all but 2 cases. In all cases some clinical improvement was noted in twelve to forty-eight hours after beginning the treatment; this followed the establishment of diuresis. The glucose saline solution apparently has a sedative action in controlling restlessness. The duration of intravenous therapy averaged sixty-five hours; all but 2 of the patients recovered, a mortality of about 22 per cent. In those that recovered a maintenance diet was resumed in less than three weeks. Blood chemistry studies showed an increase of non-protein nitrogen, usually proportional to the degree of toxicity; inorganic phosphorus values were either low or normal; calcium showed no characteristic change. Acidosis was found to be due to either a relative or an absolute increase of the chlorides of the blood or to a decrease in the fixed base; if the total base is elevated, even though chlorides are high, acidosis is not necessarily present. The non-protein nitrogen decreased rapidly when diuresis was established in this series of cases. Otherwise the adjustment of the chemical equilibrium of the blood usually required several days, and was preceded by definite clinical improvement. The number of cases treated by this method is too small to permit of definite conclusions as to its value, but the authors observe that the amount of fluid required to overcome dehydration seems to be less than with other methods; diuresis was established early in all cases; and acidosis controlled without the use of sodium bicarbonate.

Celiac Disease Treated from the Standpoint of Vitamin Deficiency

C. V. Rice (*Archives of Pediatrics* 50:358, May, 1933) notes the similarity of celiac disease to other vitamin deficiency diseases; also the fact that it never occurs in breast-fed infants. In treating cases of celiac disease, he adds a vitamin B preparation to the milk formula, and also "spintrate" (powdered spinach), which contains iron, calcium and phosphorus, as well as vitamins A, B, and G. With this addition, he has found that children with celiac disease can digest fat in the form of evaporated milk (which is included in the milk formula), and sugar in the form of grain sugar (maltose), as well as in the form of banana powder. Vegetables are also added to the diet as the child improves. Under this treatment, the author finds that the symptoms are relieved, the child gains weight, and the fat content of the stools becomes normal. A diet normal for the age of the child with adequate supply of vitamins can then be used without recurrence of symptoms.

Soy Bean Flour in Infant Feeding

G. Stearns (*American Journal of Diseases of Children*, 46:7, July, 1933) notes that in cases in which a milk-free diet is indicated in infant feeding because of an allergic response to milk protein, the use of soy bean flour has been advocated. This flour is rich in protein, but the protein is of poorer quality than milk protein and must be given at a higher level—from 20 to 22 per cent of total calories. Soy beans are rich in potassium and magnesium but contain little sodium, calcium and chloride. In soy bean feeding, therefore, it is customary to add sodium chloride and calcium, the latter usually in the form of the carbonate or the lactate. The phosphorus content has been considered adequate. In a study to determine the excretion and retention of nitrogen, calcium and phosphorus on soy bean diets (with the addition of calcium carbonate) in comparison with milk diets, it is found that the relative in-

(Continued on page 323)

Medical Times

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Bastards of Esculapius

Paul Moinet, writing in *Le Siècle Médical*, uses the delightful phrase "Bastards of Esculapius." We might expand on the subject and speak of all the "paths" that have been added to our medical lists. For we have all kinds of medical bastards: those who pull spines or legs, give herbs, treat cancer with blood medicines, and the vibration experts seen in beauty shops. Some time ago the writer was in a barber shop and saw the barber treating the lower part of the spine of a customer. When asked what the treatment was for, the barber confessed that it was for impotency. Thus another Bastard of Esculapius was born. M. W. T.

Introducing the Gynecologic "Manicure"

To the degree that abortion increases a new educational problem looms in our hospitals. The gynecologic wards of many of our institutions care for a great many emergent postabortive cases which preempt the beds that would ordinarily be occupied by the regular types of gynecologic patients. To the extent that these regular types are not cared for, the younger staff men who are supposed to be developing technical expertness in oper-

ative work suffer educationally. You can not make an Emmett, or a John Byrne, or a Skene, out of a gentleman who is compelled constantly to specialize in post-abortive activities. How are men to develop skill in plastic gynecology, for example, who are forever mopping up after the abortionists? Was it not an uncanny, constructive, and wide-ranged skill that chiefly characterized the giants of the Emmett age of gynecology? What distinguished skill is nurtured by a dilator and curet in the hands of a gynecologic "manicure"?

Another Source of Revenue for Our Hospitals

And Moses commanded the children of Israel, saying, this is the land which ye shall inherit by lot, which the Lord commanded to give unto the nine tribes, and to the half tribe.

—Numbers xxxiv. 13.

In our August issue we suggested the adoption of the Irish idea of a Sweepstakes for the benefit of our hospitals. We now make bold to propose something else besides, somewhat of the same order as a Sweepstakes, but vastly more productive of monetary emoluments and perhaps even more objectionable to the puritans who still stand in our midst protesting against this or that but who offer no constructive remedies themselves.

We propose a lottery in the interest of our hospitals. In its first successful trial in history the principle of the lottery, as we have shown in our quotation at the head of this editorial, was divinely sanctioned. Our present aim—hospital aid—deserves as high a sanction. Will the puritans say no to this?

Lotteries are now illegal, it will be urged. Our answer to this is simply that we are about to rid ourselves of the Eighteenth Amendment, a much more formidable achievement than would be the legalizing of one type of lottery making for social progress. Economic stress is rapidly liberalizing us.

France's Council of Ministers has just decided that a great national lottery shall be held as a means of balancing the budget. Lotteries of a sort are in operation there now (e.g., the Credit Foncier and certain department store sales features). Under the new national lottery a large share of the proceeds (100,000,000 francs) will go to the agricultural disasters fund.

Russia, as part of her Five-Year Plan, allots money prizes in connection with the sale of her ten-year bonds. This is a very popular administrative feature.

In Germany a national lottery provides a maximum individual prize of 200,000 marks (\$69,500). This lottery supports the re-employment scheme.

Turkey finances its aviation projects through a national lottery. Spain profits largely from her Christmas lottery. Italy is electrifying her State railroads through this means at a cost of \$300,000,000.

Sweden aids her hospitals and museums in this way and subsidizes drama, music and art. New South Wales' hospitals are similarly supported. The Nanking Government of China builds roads and purchases airplanes through its lottery. Thirty per cent of the proceeds of Argentina's national lottery is devoted to the hospitals, charitable institutions and sports; the largest individual prize runs to \$800,000. The Newfoundland lottery has profited the government greatly. India's lottery is enormously productive. Canada, in April, passed a liberal law along this line.

Virginia was colonized through lottery funds (the results have been not half bad!). A lottery rebuilt Faneuil Hall in 1761. Harvard College survived its early struggles through four successive lotteries. Funds to finance the outbreak of the American Revolution were in large part derived from lotteries (now you know at

last, reader, if you did not know but only wondered heretofore, where the money came from). Massachusetts once utilized the lottery system for administrative projects. The cost of founding the very capital itself at Washington was defrayed in part by a lottery!

Another repeal is in order. We move for what would be in effect a National Recovery Act for the hospitals. What is needed more? What is more deserved?

News-Stand Sex

The spirit of commercialization of sex is now expressing itself blatantly in certain magazines of the vulgar sort. The depression has put a crimp in the physical phase of the thing. Books and the screen play their part. It is a vicarious appeal. "The ladies who live by their charms are finding it increasingly difficult to cash in on their possessions." In fact, they find that good looking girls of the better sort who have not commercialized their sex physically but who have been economically reduced by the depression take precedence over them when it comes to posing for the aforesaid magazines. We have all been struck by the aggressive pandering to the tastes if not the energies of our hard hit *Boobus americanus*.

It is a very cheap market, from any point of view, and a nauseating spectacle in which art has no place. The type of personnel behind these toxic periodicals may be easily guessed. But the offensive racket of such precious gentry is only a passing phrase and they should not be advertised by censorship or prosecutions of any sort, a stupid strategy which insures greater profit and longer life for them.

"Looking Backward"

When Edward Bellamy, in 1887, wrote his book "Looking Backward", he saw clearly what a doctor's life should be. As a matter of fact, Bellamy pictured an ideal social state—one that might well be used today. He rambled off into the year 2000 and saw a world much changed. His chief character found himself the guest of a Boston doctor and he described a state of affairs any physician might be happy to see. Really what takes the fun out of medicine is the commercial side; we must send out bills and collect them or we cannot continue on. Bellamy's year 2000 found physicians working not for money, but for the love of their work. It should be so. Perhaps the actual year 2000 will bring us a similar state; thus far many of Bellamy's predictions have come true.

—M. W. T.

The Basis of Private Practice

Continuance of private medical practice hinges largely upon a planned and socially controlled system of production, distribution and exchange. A chaotic order, with periodic and prolonged depressions, ruins private practice and lets loose busybodies such as those who recently tried to put us wholly on the defensive and to shove us down to a pretty low level of practice.

The high wage scale that we used to hear about in 1927 was pure twaddle, for then the average weekly industrial wage was actually \$23.17, not a living wage at that time, even if there had been no sickness, no lay-offs and no unemployment! What could be more pathological, socially speaking, than that? By this criterion we can now gauge the rotten

state of society which must have existed then at various levels.

Real recovery will have to carry us into something very different from all that, if we ourselves are to function decently as private practitioners.

We at least understand the indications now, as we say at the bedside.

Correspondence

The Final Debunking of Contraception

Editor, MEDICAL TIMES AND LONG ISLAND MEDICAL JOURNAL:

May I ask you for the privilege of the pages of your journal for a reply to your editorial of June, 1933, entitled "The Final Debunking of Contraception," which has but recently come to my attention.

The fact that certain advocates of birth control are also in favor of sterilization has led your editorial writer to the conclusion that contraception is a failure, and that, to use his expressive phrase, "the old hokum is in the discard."

It must be obvious, however, that Dickinson, Rudin, Havelock Ellis and even Rongy, the men quoted in the editorial, advocate sterilization only for certain selected types of patients, not as a general birth control measure.

Sterilization and birth control do not necessarily have the same purpose. Birth control is a temporary controllable measure. A surgical sterilization is a permanent irreversible operation which places procreation beyond the control of the individual. Certainly, sterilization cannot possibly be advocated as a widespread measure for family limitation.

Havelock Ellis begins the article which is quoted in your editorial, as follows: "The necessity of birth control is now generally recognized, not only by those who do not desire to have children but by those who do. The reason is that, both for the sake of the mother and for the health and well-being of the offspring, it is desirable that births should be properly spaced. . . ." It must be obvious that sterilization is totally out of the question for such purposes and that the only resort is contraceptive measures.

That the use of contraceptives does require a certain amount of attention and application and constitutes a certain degree of "bother" is quite true, but so are many other of our daily activities which we have come to accept as a necessary part of our personal hygiene. Nor does the fact that many people will refuse or fail to make use of contraceptives necessarily imply that contraception is a "failure and hokum." No more than as someone has pointed out, the use of eyeglasses can be considered a failure because certain people refuse to wear them at home on occasion.

As to the efficacy of modern contraceptives they have been found by medical observers in many countries to be entirely reliable when properly prescribed and used. Doctor Rongy may have his opinion on this matter but I am basing mine upon a very wide clinical experience at the Birth Control Clinical Research Bureau and upon the statements from physicians all over the country who have had most experience in this field.

It is quite true that we do not possess as yet a perfect and ideal contraceptive, but that may be regarded not as a failure of contraception but as a failure of the medical profession to devote more scientific research and investigation to this extremely important medical problem. It is truly time that the subject of birth control should be approached in a rational, scientific spirit and that the "old hokum" of prejudice and bias be thrown into the discard.

Very truly yours,

HANNAH M. STONE.

New York, August 11, 1933.

Economics

(Concluded from page 314)

people. So also will the rules to prohibit all advertising of remedies which is inaccurate, or untruthful.

The new Act may not be completely successful. All the purposes of its sponsors may not be fully attained, but as recently expressed by a former Governor of our State, it is the very best plan now known to relieve the great distress of the moment and it merits the wholehearted support of all.

MEDICAL BOOK NEWS

Edited by WILLIAM HENRY DONNELLY, M.D.

All books for review and communications concerning Book News should be addressed to the Editor of this department at 1313 Bedford Avenue, Brooklyn, New York.

OCTOBER, 1933

REVIEWS

Neuropathology

NEUROPATHOLOGY. The Anatomical Foundation of Nervous Diseases. By Walter Freeman, M.D. Philadelphia, W. B. Saunders Company, 1933. 349 pages, illustrated. 8vo. Cloth, \$4.00.

This illustrated book of 349 pages has been divided into thirteen chapters dealing in turn with the cytology of the nervous system; the diseases of the meninges; vascular diseases; inflammation of the central and peripheral nervous system; tuberculosis; syphilis; leprosy, parasitic and fungus infections; intoxications; injuries; the functional psychosis, senile dementia and epilepsy; malformations; degenerations; and the intracranial tumors. The illustrations are clear and the photomicrographs well chosen.

The discussions are concise and abbreviated with little if any repetition. As stated by the author in the preface, the books dealing with neuropathology, except for the German works, are very much out of date. During the past few years a great number of excellent articles, dealing with pathological entities of the nervous system, have appeared in the current literature. This book brings these important facts together in a very reasonable manner. It should be a valuable aid to the general pathologist and help the neurologist to better understand the clinical manifestations of the diseases with which he deals.

JEFFERSON BROWDER.

Holt's Diseases of Infancy and Childhood

HOLT'S DISEASES OF INFANCY AND CHILDHOOD. A Text-book for the Use of Students and Practitioners. By the late L. Emmett Holt, M.D., and John Howland, M.D. Revised by L. Emmett Holt, Jr., M.D., and Rustin McIntosh, M.D. Tenth Edition. New York, D. Appleton & Company [c. 1933]. 1240 pages, illustrated. 8vo. Cloth, \$10.00.

The tenth edition of "Holt" hardly requires a review. Every American man of medicine esteems it in the edition he studied and the new edition maintains its reputation by retaining the good old, and adding the necessary new.

Both Dr. Holt and Dr. Howland have died since the previous edition was published and this revision has been written by Dr. Holt, Jr., and Dr. Rustin McIntosh, Professor at Columbia.

However, if a critique demands criticism, this reviewer's comment would be that the life saving treatment of major diseases is admirably covered, but, if a junior physician seeks what one may call the "comfort treatment" of the lesser diseases, which we are told constitute eighty-five per cent of his practice, he may suffer some disappointment. The authors are usually vague in dosage even when recommending drugs, and the reader either knew in advance, or knows not after, how much he shall give.

Nevertheless this is a minor criticism and we would recommend that every one practicing with children should get his new Holt; it is nearly ten years since the one before.

W. D. LUDLUM.

Experimental Analysis of Development

THE EXPERIMENTAL ANALYSIS OF DEVELOPMENT. By Bernhard Dürken, M.D. New York, W. W. Norton & Company, Inc., [1932]. 288 pages, illustrated. 8vo. Cloth, \$4.75.

A brief survey of experimental analysis of growth which will serve as a valuable aid to biologists and medical students. Much credit must go to the translators for their able work.

This book will help awaken an interest in experimental embryology.

NATHAN REIBSTEIN.

The Mechanism of Nervous Action

THE MECHANISM OF NERVOUS ACTION. Electrical Studies of the Neuron. By E. D. Adrian, M.D. Philadelphia, University of Pennsylvania Press, 1932. 103 pages, illustrated. 8vo. Cloth, \$2.00. (The Eldridge Reeves Johnson Foundation for Medical Physics.)

"The Mechanism of Nervous Action" by E. D. Adrian is another of the Johnson Foundation Lectures. It presents briefly and concisely the newer researches in the field of nerve physiology.

In the beginning chapter the development and history of Electrophysiology are discussed. Considerable emphasis is placed on the vacuum tube amplifier which "because of its ability to detect and record small electrical changes has opened up a large field for reinvestigation"; thus largely superseding the string galvanometer.

After reviewing the evidence, both pro and con, Adrian arrives at the conclusion that whenever there is nervous communication, there is also an accompanying electrical change which is a faithful record of the way in which a nerve fiber performs its function. A sensory message, according to him, consists merely of a series of brief impulses or waves of activity following one another more or less closely.

The subjects of adaptation and production of rhythmic discharge in sense organs are discussed; an attempt being made to explain them. The author considers the resonance hypothesis of Helmholtz, in the light of the work by Wever and Bray on the auditory nerve, to be open to criticism. His conclusion in reference to this point seems to be that with the auditory as with the tactile nerve endings, the intensity of the stimulus is judged by the number of impulses making up each volley, the pitch of a note being dependent upon the frequency of each volley rather than upon the frequency in each nerve fiber.

Adrian does not think that the division of the sensory fibers into epicritic and protopathic systems is a very satisfactory one. Rather he favors the views of Gasser and Erlanger, who, in the mammal, have found two distinct groups of sensory fibers which can be differentiated according to measurements of conduction. In reference to pain, he states that nerve fibers which propagate this sensation seem to belong to no one distinct group, although he thinks that sensation produced by a nerve fiber of a given type becomes a closer approach to pure pain in proportion to the slowness of conduction of the fiber and the lack of sensitivity in the end organ.

The electrical studies in the neurone is brought to a close by a discussion of conditions existing in motor and sympathetic fibers; an attempt also being made to explain what may happen in groups of nerve cells.

DAVID I. ABRAMSON.

Anleitung zur frühzeitigen Erkennung der Krebskrankheit
ANLEITUNG ZUR FRÜHZEITIGEN ERKENNUNG DER KREBSKRAKHEIT. Im Auftrage des Landesausschusses zur Erforschung und Bekämpfung der Krebskrankheit in Sachsen. Bearbeitet von Best und others. Leipzig, S. Hirzel, 1932. 134 pages. 8vo.

A composite expression of the opinion of the eight co-authors on this ever-important subject, going into considerable detail in the discussion of the various sections, usually the seat of involvement. We recommend its perusal to every physician and surgeon to bring to his attention the ever-present danger of the possibility of malignant invasion, even in apparently benign diseases. The chapter on the digestive organs is especially well written and to the point for those interested in this subject.

L. KOEMPEL.

The Aetiology of Tuberculosis

THE AETIOLOGY OF TUBERCULOSIS. By Robert Koch, M.D. New York, National Tuberculosis Association, 1932. 48 pages, illustrated. 8vo. Fabrikoid, 50c.

The National Tuberculosis Association is to be highly commended for publishing this most excellent translation of the original paper by Dr. Robert Koch on "The Aetiology of Tuberculosis." The translation has been done by Dr. and Mrs. Max Pinner and is most worthily performed.

It seems strange in all the years that have elapsed since the great Koch first published his epoch making treatise that never before has a suitable English rendition been offered. The paper itself is preceded by one of Dr. Allen Krause's interesting and erudite introductions. The whole is put together in beautiful form,—a masterpiece in the art of printing.

FOSTER MURRAY.

Un Pericolo Sociale: Le Brucellosi

UN PERICOLO SOCIALE: Le Brucellosi. By A. Alessandrini and M. Pacelli. Rome, "Annali d'Igiene," 1932. 184 pages, illustrated. 8vo. Paper, 24 lire.

A monograph treating the subject of Brucella, which is a generic name for a group of bacteria—*Bacillus Abortus*—*Bacillus Bronchisepticus* and *Bacillus Melitensis*. The material for the monograph was gathered, by the two authors, during the epidemic of Undulant Fever in Arezzo, Italy, 1925. It was found to be due to infection by the bacillus of Bang, transmitted to man by bovines affected by *Bacillus Abortus*.

This volume, therefore, treats principally with the phases of Epidemiology and prophylaxis of Brucellosis. It is concise yet very clear and instructive.

GAETANO DE YOANNA.

A New Approach to Dietetic Therapy

A NEW APPROACH TO DIETETIC THERAPY in Epilepsy, Eclampsia of Pregnancy and Infancy, Migraine, Angina Pectoris, Bronchial Asthma, Allergic Diseases, Gout, Essential Hypertension, Pernicious Anemia, Polycythemia, Acne Vulgaris, Nervous and Psychic Disturbances, Constitutional Changes, Aging, etc. By Eugene Földes, M.D. Boston, Richard G. Badger, The Gorham Press, [c. 1933.] 434 pages. 8vo. Cloth, \$5.00.

The author has produced a very expansive monograph in which he propounds a theory on the pathogenesis of the following diseases—epilepsy, eclampsia, migraine, angina pectoris, asthma, gout, diabetic acidosis, hypertension, acne and a group of hematological diseases. He finds an abnormal retention of both water and salt in all the diseases just mentioned, and feels that this metabolic disorder is uniformly responsible for the production of each of these syndromes. He quotes the literature rather freely—particularly the German—and engages in considerable speculation to prove his point. His chapters on therapeutics are fairly general in the recommendation of so-called anti-retentional diets and diuretics as almost cure-alls. It is rather poorly written, sentences long and involved, making reading somewhat laborious.

WILLIAM S. COLLENS.

Medical State Board Examinations

MEDICAL STATE BOARD EXAMINATIONS. Topical Summaries and Answers. By Harold Rypins, M.D. Philadelphia, J. B. Lippincott Company [c. 1933]. 448 pages. 8vo. Cloth, \$4.50.

In presenting this work, the author has been conscious of the multiple problems besetting the medical student who is preparing for state board examinations. In organizing his material, he has kept in mind the current practice of state boards to examine candidates on their ability to apply medical knowledge clinically.

The book is composed of ten chapters, the first of which is a short personal foreword to the candidate in which the author assures him that with adequate preparation and by the application of psychological devices, he will have nothing to fear in the state board examination.

The other chapters are devoted to anatomy, physiology, chemistry, bacteriology, pathology, hygiene and preventive medicine, obstetrics and gynecology, medicine, and surgery. The author has made no endeavor to treat these subjects comprehensively, but has epitomized in a lucid, concise manner the salient points of each. At the end of each chapter is a number of representative state board questions covering the topic just treated. These should make a unique appeal to the student preparing for a state board examination.

There is a detailed index, which the reader will find useful for easy reference.

This book will be of value not only to those students preparing for state board examinations but also to undergraduate medical students preparing for their degree examinations.

FREDERIC DAMRAU.

Health and Environment

HEALTH AND ENVIRONMENT. By Edgar Sydenstricker. New York, McGraw-Hill Book Company, 1933. 217 pages. 8vo. Cloth, \$2.50.

This monograph is one in a series of thirteen contributions prepared under the direction of ex-President Hoover's Research Committee on Social Trends. In aiming to ascertain the physical status in any community statistics are relied upon which often involve misconceptions. For example, while heart disease may be a very common cause of death it is not infrequently recorded as such in the absence of autopsy findings or for want of some more explanatory diagnosis. In the same way our conception of diseased tonsils is undergoing a constant change which registers variations. The author fails to take these factors into consideration but aims to make his deductions on the data that he has received. He is, however, in a position to report certain observations which are incontrovertible. He tells us that "no one can escape the fact that the vitality of the American people is impaired to an appalling extent by disease and other conditions." Even the increasing span of human life is more apparent than real for "so large a proportion of the population fails to attain even a modest life span—say, 60 or 70 years." Such common disorders as syphilis, tuberculosis, and goiter are dealt with geographically and their comparative incidence is charted on maps.

The physician who reads all these truths will wonder to what extent his intensive research in treating the sick really contributes to the prolongation of human life. Whereas we are concerned in aiming to determine the causes of disease and in eradicating these causes, this book aims to tell the reader that disease and death in appalling figures are still facing us. The author concludes with the statement that "there is little if any evidence that environmental (social, sanitary, medical) changes have so far affected greatly the mortality of older persons."

EMANUEL KRIMSKY.

Cervico-Vaginitis of Gonococcal Origin in Children

CERVICO-VAGINITIS OF GONOCOCCAL ORIGIN IN CHILDREN. Report of a Project of the Bellevue-Yorkville Health Demonstration of New York City. By Walter M. Brunet, M.D., and others. New York, Milbank Memorial Fund, 1933. 97 pages, illustrated. 8vo.

This report is a detailed investigation of 241 children with clinical gonorrhea. Nothing new was discovered, except that in four-fifths of the cases the cervix was affected. Treatment was of little if any value. "The disease is self-limited and usually fades out in a few months." The Milbank Memorial Fund provided the funds for a three year study which revealed but little.

CHARLES A. GORDON.

The Elements of Medical Treatment

THE ELEMENTS OF MEDICAL TREATMENT. By Robert Hutchison, M.D. Second Edition. Baltimore, William Wood & Company, 1933. 188 pages. 12mo. Cloth, \$2.00.

The necessity for a second edition of this volume attests its value. The book is the result of the author's experience while teaching elementary therapeutics and the application of drugs in medicine. The commoner diseases of the various systems are discussed, together with the methods more commonly used in the treatment of the conditions. This is a practical book and contains much information.

HENRY M. MOSES.

Diet in Sinus Infections and Colds

DIET IN SINUS INFECTIONS AND COLDS. By Egon V. Ullmann, M.D. New York, The Macmillan Company, 1933. 166 pages. 12mo. Cloth, \$2.00.

This book is in keeping with the progress that is being made in many different quarters in the matter of the relation of diet, nutrition and body chemistry to the general physical welfare and incidentally to conditions of the upper respiratory tract. The author has assembled a large amount of material that relates to diet in its influence upon the nasal passages and has presented it in a form which makes it of value.

The ill effect of too much acid forming foods is stressed. The various chapters devoted to a single food or class of foods are of interest and are instructive while the chapters on Fruits and Salt and Calcium deserve special mention. The main features of the author's attack lie in overcoming too much acid intake, encouraging the calcium metabolism and watching the vitamin content of the diet. The appendix of diets and menus are of value although experience has shown that it is not a simple matter to get patients to pay the required attention to recipes and menus.

The volume appears to have been written for popular consumption yet much of what has been written will be better understood by the physician than by the layman. The weakness of this book lies in the fact that it is designed neither for one group nor for the other, but apparently for both. Such

books always confuse the lay mind and do not accomplish as much as they might if written for the one group.

If this book does nothing more than direct the attention of physicians and otolaryngologists particularly to the fact that diet and chemical reactions of the body very frequently have a bearing upon nasal infections, it will serve its purpose well.

M. C. MYERSON.

Practical Hematological Diagnosis

PRACTICAL HEMATOLOGICAL DIAGNOSIS. By O. H. Perry Pepper, M.D. and David L. Farley, M.D. Philadelphia, W. B. Saunders Company, 1933. 562 pages. 8vo. Cloth, \$6.00.

To take a subject like Hematology and reduce it to its baldest outline without sacrificing accuracy is truly a tremendous task. In a careful perusal of this work one is impressed by certain observations which seem apropos at this time. In a consideration of the vital staining of leucocytes, the authors point out that it is of little practical value in Haematologic diagnosis. This view is shared by almost all the clinical haematologists. The Sedimentation Test is carefully evaluated and it is refreshing to see the conclusion that it is "a clinical test of great value, but one with many limitations owing to its lack of specificity." A very useful bit of information for instance and one which will be surprising to the general practitioner, is the presence of a pre-leucopenic leucocytosis in early typhoid.

There are certain statements, however, which cannot go unchallenged. It is stated that the normal polymorphonuclear neutrophile percentage ranges between 55 and 75. In our opin-

ion, 75% is a definite neutrophilia. The normal bleeding time is said to be between four to six minutes. This is unduly high. We consider 3 to 4 minutes the upper limits of normal. Again, the authors point out that in the leucocytosis of malignancy one must postulate the presence of either infection or hemorrhage. Recent studies have not borne out this statement inasmuch as the leucocytosis was present in the absence of such additional factors; and seemed to be due to the malignancy per se. The statement regarding platelets in malignancy is rather equivocal. Here again recent studies have reaffirmed the presence of a definite thrombocytosis; in fact, a thrombocytopenia is rare except as the authors state it be the result of excessive irradiation over regions rich in bone-marrow.

In a book entitled Practical Haematologic Diagnosis, one would expect to find information of practical value to the practitioner. A blood study is never of practical value unless it is correlated to the clinical picture. Without it the information is indeed barren and of no significance. The general practitioner will be disappointed after reading the hematology of Pernicious Anemia, to find nothing about the associated glossitis and achlorhydria. The student who reads this work will not gain much unless he is equipped with a previous knowledge of hematologic syndromes.

It must be said, however, that the subject covered is well handled and authoritative. The bibliography is useful. This work would make a good companion book to a treatise on Clinical Haematology—it is not sufficient in itself.

MAURICE MORRISON.

BOOKS RECEIVED

Books received for review are acknowledged promptly in this column; we assume no other obligation in return for the courtesy of those sending us the same. In most cases, review notes will be promptly published shortly after acknowledgment of receipt has been made in this column.

ARTERIOSCLEROSIS. A Survey of the Problem. Edited by Edmund V. Cowdry. New York, The Macmillan Company, 1933. 617 pages, illustrated. 8vo. Cloth, \$5.00. (A publication of the Josiah Macy, Jr. Foundation.)

THE DYNAMICS OF THERAPY IN A CONTROLLED RELATIONSHIP. By Jessie Taft, Ph.D. New York, The Macmillan Company, 1933. 296 pages. 8vo. Cloth, \$2.50.

PSYCHOANALYSIS AND MEDICINE. A Study of the Wish to Fall Ill. By Karin Stephen, M.A. New York, The Macmillan Company, 1933. 238 pages. 12mo. Cloth, \$2.50.

GASTRIC ANACIDITY. Its Relations to Disease. By Arthur L. Bloomfield, M.D. and W. Scott Pollard, M.D. New York, The Macmillan Company, 1933. 188 pages. 12mo. Cloth, \$2.50. (Macmillan Medical Monographs.)

THE BIOLOGY OF THE PROTOZOA. By Gary N. Calkins, Ph.D. Second Edition. Philadelphia, Lea & Febiger, 1933. 607 pages, illustrated. 8vo. Cloth, \$7.50.

A TEXT-BOOK OF NEUROPATHOLOGY. By Arthur Weil, M.D. Philadelphia, Lea & Febiger, 1933. 335 pages, illustrated. 8vo. Cloth, \$5.00.

THE SCIENCE AND PRACTICE OF SURGERY. By W. H. C. Romanis, F.R.C.S. and Philip H. Mitchiner, M.D. Fourth Edition.

Philadelphia, Lea & Febiger, 1933. Two volumes totalling 1910 pages, illustrated. 8vo. Cloth, \$12.00.

CANCER AND OTHER CHRONIC DISEASES IN MASSACHUSETTS. By George H. Bigelow, M.D., and Herbert L. Lombard, M.D. New York and Boston, Houghton Mifflin Company, 1933. 355 pages, illustrated. 8vo. Cloth, \$4.00.

DIE EXPERIMENTELLE PHARMAKOLOGIE. By H. H. Meyer and R. Gottlieb. 8th Auflage. Berlin, Urban & Schwarzenberg, 1933. 813 pages, illustrated. 8vo. Paper, RM. 30.

FISIOPATOLOGIE DELLA VECCHIAIA. By Giuseppe Levi, Alberto Peperè and Gaetano Viale. Volume I. Milano, Italy, Istituto Sieroterapico Milanese, 1933. 374 pages, illustrated. 8vo.

SURGERY OF THE STOMACH AND DUODENUM. By J. Shelton Horsley, M.D. St. Louis, C. V. Mosby Company, 1933. 260 pages, illustrated. 8vo. Cloth, \$7.50.

ESSENTIALS OF PRESCRIPTION WRITING. By Cary Eggleston, M.D. Fifth Edition. Philadelphia, W. B. Saunders Company, 1933. 155 pages. 16mo. Cloth, \$1.50.

PEDIATRICS. By Henry Dwight Chapin, M.D. and Lawrence T. Royster, M.D. Seventh Edition. Baltimore, William Wood & Company, 1933. 775 pages, illustrated. 8vo. Cloth, \$7.00.

Contemporary Progress

(Concluded from page 318)

crease in the intake of nitrogen and calcium, compared to the phosphorus intake with the soy bean diet, resulted in an insufficient retention of phosphorus. The urinary excretion of calcium was increased, and this excessive excretion of calcium is interpreted by the author as evidence that calcium is absorbed in excess of what can be deposited in bone with the limited amount of phosphorus available. The substitution of dicalcium phosphate for calcium carbonate in the soy bean diet improved the relative retentions of nitrogen, calcium and phosphorus; soy bean food thus modified appeared to be a satisfactory food for infants. From these studies it is concluded that in infant feeding, the relative proportions of nitrogen, calcium and phosphorus in the diet are as important as the absolute intakes. As the relative proportions of these elements in cow's milk seem to allow adequate retention of each, this ratio should be maintained when a milk substitute is used.

Use of Milk and Progress of Undernourished School Children

F. R. Lininger (*American Journal of Public Health*, 23:555, June, 1933) reports a study of undernourished pupils in the Philadelphia public schools in special health classes, where careful health records are kept. It was found that all children receiving milk either at school or at home showed 29 per cent greater increase in weight than those having no milk; those given milk at school and not at home showed 24 per cent greater gain in weight; those given milk both at school and at home 45 per cent greater gain in weight than those re-

ceiving no milk. In the groups receiving milk there was a higher percentage of children below twelve years of age than in the no-milk group; thus, the author notes: "Those who used milk made greater gains than those who did not, not because they were older but despite the fact that they were younger." In the two-year period of observation, 45 per cent of the pupils receiving milk improved in scholarship, while only 24 per cent of the no-milk group showed such improvement.

Peptic Ulcer in Children

R. L. J. Kennedy (*Journal of Pediatrics*, 2:641, June, 1933) notes that duodenal ulcer occurs at all ages of infancy and childhood. Ulcers in infants in the first year or two of life are usually acute, and the chief symptom is melena. After that age chronic duodenal ulcer may be present; the clinical picture may be characteristic, like that in adults, or indefinite and confused so that diagnosis is difficult. The author reports 6 cases of chronic duodenal ulcer in children four to eleven years of age, treated at the Mayo Clinic. In 2 of these cases the clinical picture and roentgenological findings were typical at the early ages of four and six years respectively. Roentgenological examination is the best single procedure for diagnosis of duodenal ulcer in children, but even this may fail to indicate an ulcer when present, as in one of the cases reported. Duodenal ulcer should be sought for in children who have indefinite chronic or recurring abdominal pain. Treatment may be medical or surgical as in adults.

Auricular Fibrillation in Childhood

S. F. Jenkins and N. Owens (*Archives of Pediatrics*, 50:479, July 1933) note that recent studies have indicated that auricular fibrillation is more common in children under ten years of age than is commonly supposed. The case reported by the authors occurred in a negro girl ten years of age when she came under their observation. She had had frequent attacks of rheumatic fever since the age of two; and had cardiac symptoms four years later. At the time of admission there was auricular fibrillation, but no marked symptoms of congestive heart disease; the diagnosis was mitral disease. After ten days rest in bed quinidine sulphate was given in increasing daily doses up to 30 grains the tenth day; a total of 164 grains was given before regular sinus rhythm was established. At this time a fine urticarial rash was noted on the chest and the drug was discontinued for a few days, then given again in gradually diminishing doses. The patient when discharged had a regular, although rapid heart rate; she maintained a normal sinus rhythm and felt well for five months without further medication. Then fibrillation developed again; quinidine sulphate was given, but was not well tolerated and did not render the heart rhythm normal for more than a few hours. The patient developed symptoms of congestive heart disease. In this case, therefore, the use of quinidine sulphate, while at first successful in controlling the auricular fibrillation, had no lasting beneficial effects.

Roentgen-Ray Treatment of Inflammatory Processes in Children

L. Liebenam and H. Schoenfeld (*Monatsschrift für Kinderheilkunde* 58:104, June 14, 1933) report the treatment of various types of inflammatory processes in children with the Roentgen rays at the Leipzig University children's clinic. For localized processes, a 15 per cent. erythema dose was used; for more extensive lesions a 3 to 5 per cent erythema dose. Of the 573 cases treated, 328 were cases of non-tuberculous acute and sub-acute adenitis, involving chiefly the cervical lymph glands. In these cases results were excellent; in nearly 50 per cent, the inflammation and swelling receded without suppuration. In acute osteomyelitis, the Roentgen therapy was ineffective but chronic osteomyelitis usually responded well to the treatment.

Interpretation of Abdominal and Back Pain In Urological Diseases

(Concluded from page 294)

Sacral pains in the female are often dull and more or less constant when the individual is standing. Such a case with ectopic kidneys was encountered. Most cases of this complaint have a retroversion or retroflexion of the uterus. Women who have borne children and have a relaxed pelvic floor with cystocele complain of dull pains higher up in the mid-lumbar region and even over the lumbar muscles. Dull or sharp continuous pain in this region unaccompanied by muscle spasm or bony deformity, with a normal mobility, should lead one to suspect strongly internal genital infections, not necessarily gonococcal in type. The prostatic and seminal vesicular fluids will show pus and often organisms. Back pains due to prostatic and seminal vesicular lesions disappear with marked rapidity when treatment is applied.

Many times our patients complain of dull pains around the crests of the ilia, present day and night, resistant to application of heat and to simple medication. Here, again, the prostate and seminal vesicles may be the offending organs. These patients are often passed about from one physician to another and discarded into the neurotic group.

The acute vasitis is still the cause for some patients being sent to the hospital for an acute appendicitis. Pain, of course, is severe, sharp, dragging and often shooting from the testicle upward and just to the inside of the crest of the ilium. This condition often precedes an epididymitis when the infection is ascending in type. An examination of the scrotum and cord is essential to prevent an unnecessary operation. This is an old story but one which needs emphasizing every year in our clinic.

The pains from malignant diseases of the urological tracts are often lacking during the early stages of the neoplasm. A prostatic cancer can develop to considerable size without a manifestation of pain. A bladder cancer may give dull pain in the bladder region even before there is much frequency or any hematuria. The prostatic cancer readily metastasizes to the sacrum and lumbar regions, so that any man who is sixty years of age, whether he has bladder symptoms or loss of weight, should be examined with this in mind. The patient often describes the pains as rheumatic in type and worse at night. They often radiate down to the thighs as hot flash-like pains or shooting pains. The malignancies from the testicles metastasize to the glands along the aorta and, as they develop, give a progressive, dull, sharp, constant pain in the mid-abdomen. These pains from malignant conditions respond poorly to all kinds of therapeutics. It is needless to give the further associated picture of nausea, vomiting, cachexia, etc. When one sees the picture of malignancy just described with normal lower urinary and sex organs, beware of the small kidney in which there is a developing mass which can neither be seen or felt.

Summary

Urological tract lesions may be manifested by acute, severe, sharp, dull, aching or persistent abdominal pains either localized or radiating, and when radiating they, as a rule, radiate in the direction of the outflow of urine. Rarely, if ever, do they radiate above the twelfth dorsal vertebra or onto the costal cage. Gastric symptoms of nausea and vomiting, with pain, are common with renal irritations and obstructions. Mid-line back-aches or pains are frequently due to malignant metastasis or to infections of the prostate and seminal vesicles, both of which are often overlooked. An accurate history of an abdominal pain, a good examination, a careful urine examination for blood and pus and staining for organisms will lead to a reasonably correct diagnosis in a very high percentage of cases.

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2 Marshall Road, Hamden.

Use of Drinker Respirator in the After-care of Infantile Paralysis

According to ARTHUR T. LEGG, Boston (*Journal A. M. A.*, March 4, 1933), the use of the respirator in the acute stage of infantile paralysis has saved the lives of many patients with respiratory involvement. Not only was the mortality of infantile paralysis with involvement of the muscles of respiration much greater before the invention of this machine but many of those who survived died subsequently with some lung disease resulting from diminished aeration. Having seen these patients with deformed chests and having seen demonstrated what the respirator would do in the acute stage, the author conceived the idea of using the respirator as an exerciser after the need for its use to maintain life had passed. Measurements of voluntary expansion of the chest, taken on a series of patients who received regular daily treatment in the respiration machine over a period of months, showed a definite and steady increase from amounts under one-half inch up to two and three inches of voluntary expansion away from the machine. It was noticeable that this expansion was produced mainly by the intercostal muscles as in a normal person, without the excessive use of the accessory muscles of respiration, such as the sternocleidomastoids, which, if present, were strikingly used at first. From a medical standpoint, the increased aeration of the lungs and the deeper movement of the diaphragm in the abdominal cavity resulting from the use of the respirator should be an aid to the general health of the patient, in addition to its value in preventing deformities of the chest and in aiding the return of power to the muscles of respiration.

